NordGen

Diversity for present and future

Plant collecting missions in the Nordic region for conservation and utilization

Lena Ansebo, NordGen

Collecting seeds of Angelica, Iceland 2008

NordGen

Genetic resources

Living material with genes of both
present and potential value for humans

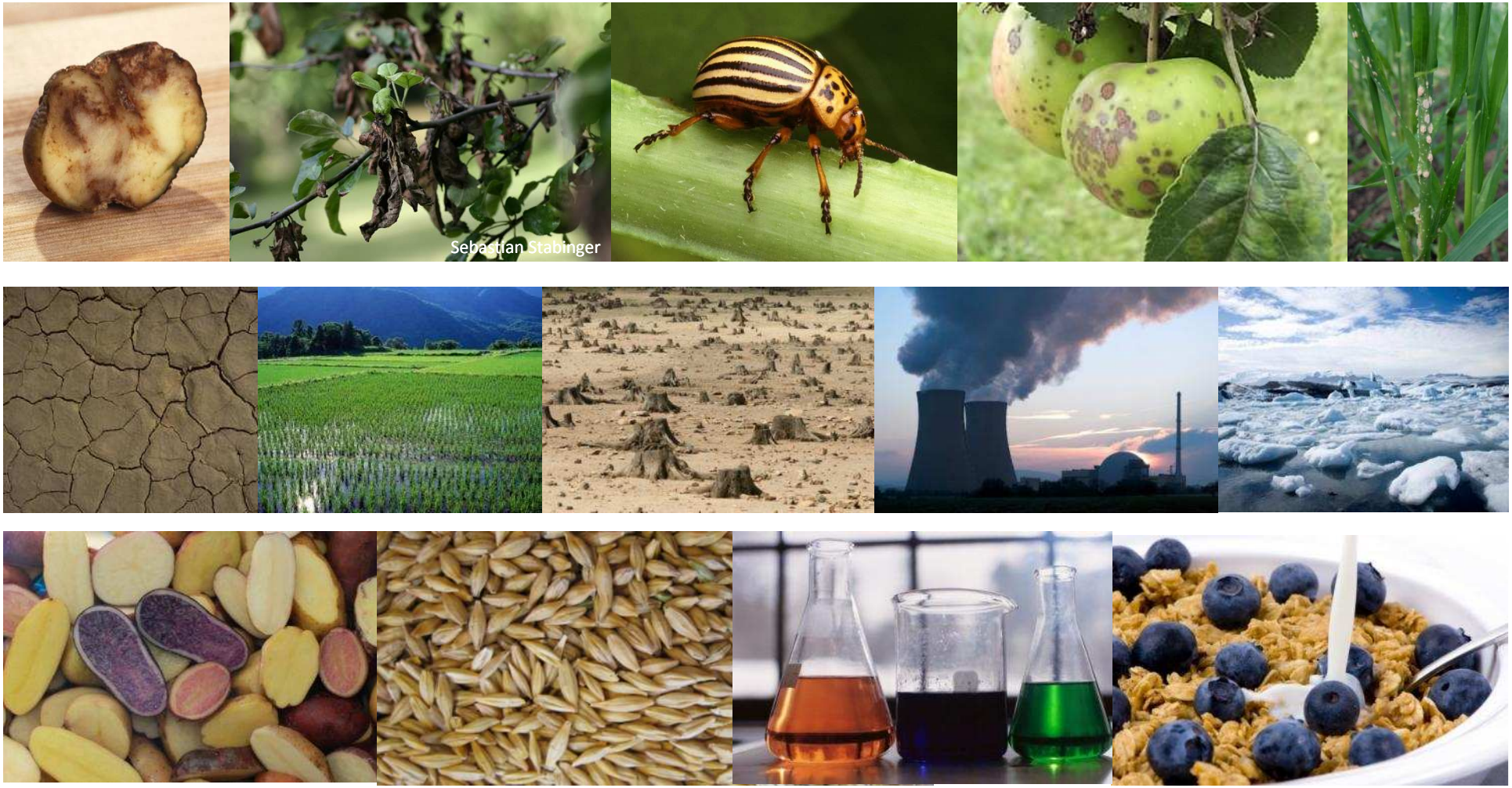
PGR – all agri- & horticultural crops, some wild relatives

NordGen

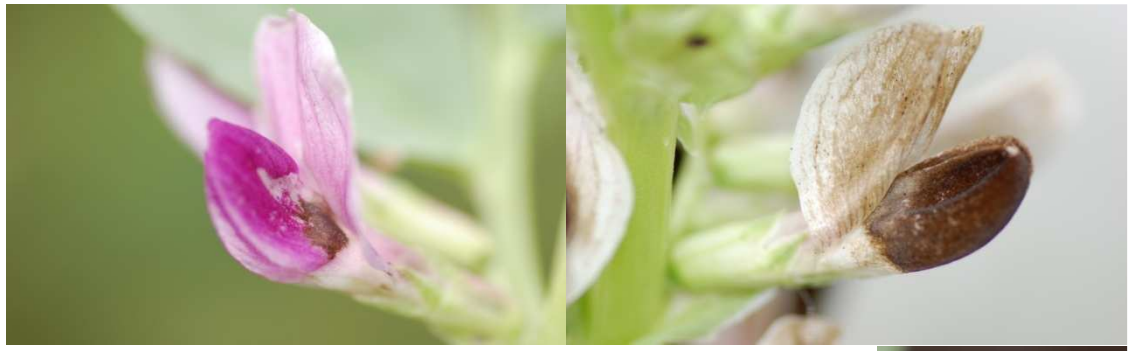
Why conserve?

Constant flow of new, developed varieties
Decreased number of varieties used
Decreased time on the market
Decreased variation within a variety

NordGen



NordGen



Access to genetic diversity is important!

The base for

– advancement within breeding

– sustainable agriculture

– global security of food supply

Contributes to finding new production niches

NordGen

How conserve?

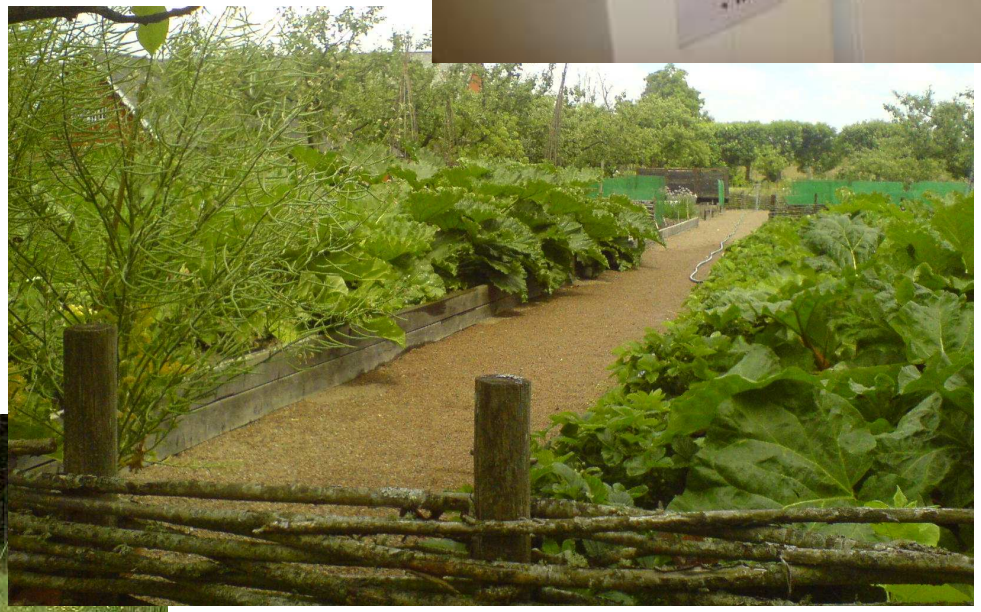
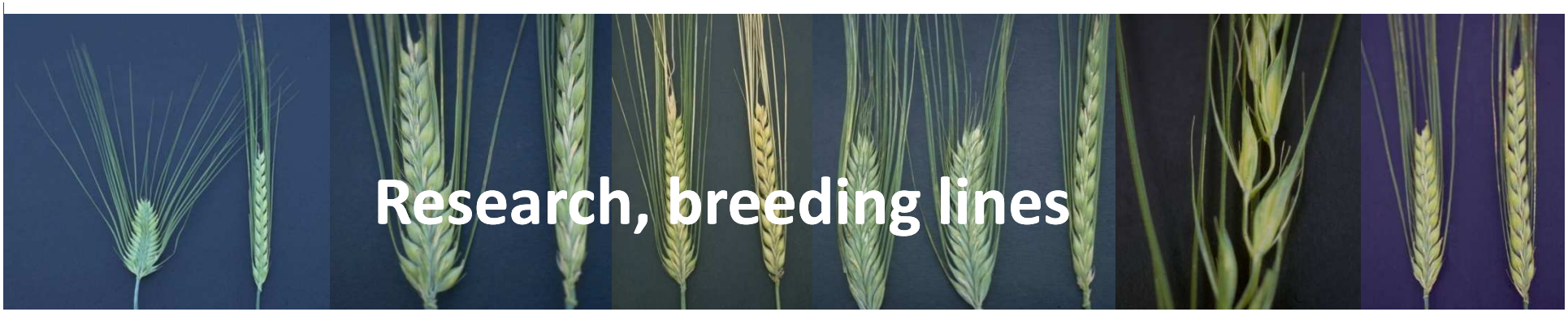


Photo: Sten Porse, Wikimedia commons 2011-08-30

NordGen

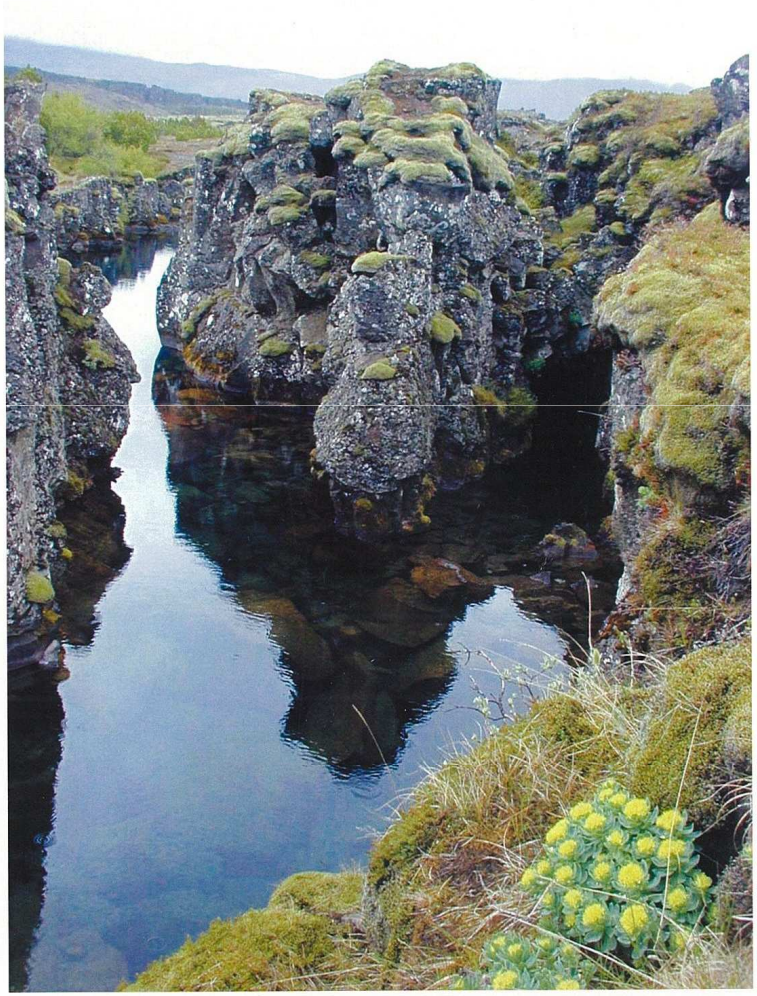
How do we collect?



NordGen

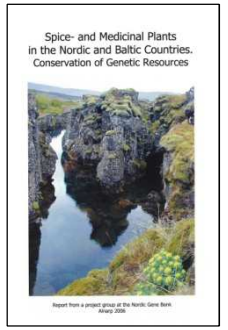
NordGen

Spice- and Medicinal Plants in the Nordic and Baltic Countries.
Conservation of Genetic Resources



Report from a project group at the Nordic Gene Bank
Alnarp 2006

NordGen



SPIMED

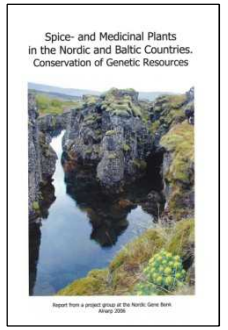
Spice and medicinal plants in the Nordic and Baltic countries – strategies for conservation of genetic resources of minor crops

2002-2005

All Nordic-Baltic countries represented in the group
(Norway, Finland, Denmark, Sweden, Iceland, Estonia, Latvia, Lithuania)

MAP= Medicinal and Aromatic Plants

NordGen



Part 1

Considerations and recommendations for conservation of MAP in the Nordic Baltic countries.

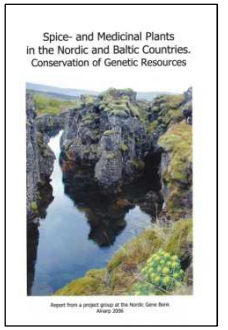
A suggested ’mandate taxon’ list - 134 wild growing species.

Current and foreseen threats to these species.

A list of suggested projects to conserve and increase use of indigenous genetic resources.

Recommends coordination of Nordic –Baltic projects with equivalent work in other countries.

NordGen



Threats

Habitat alteration and loss due to
- change of agricultural practice
- change of land use, construction of new buildings, infrastructure etc

Environmental pollution

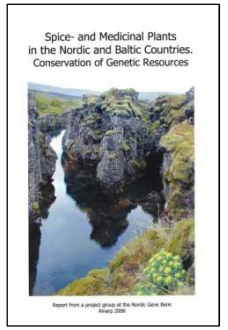
Over-exploitation due to harvesting of material and destructive harvest techniques

Climate change

Invasive species

Photos: Hollanmatej and Böhringer, Wikimedia Commons 2011-08-29

NordGen



Suggested future activities/projects regarding...

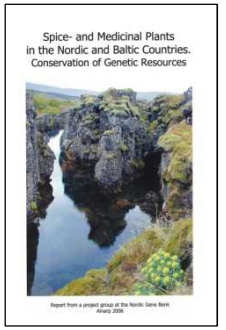
- **criteria** for prioritising species and conservation initiatives
- **new** inventories and collecting missions
- **establishing** collections and use of accessions (plant/seed sample of a clone/population)
- **characterisation and evaluation** of accessions in collections
- ***in situ* conservation** initiatives


Photo: Sten Porse

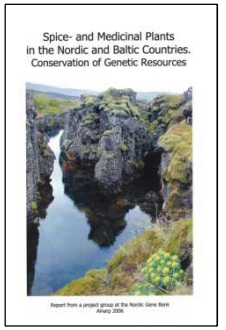
NordGen

Part 2

8 prioritised species

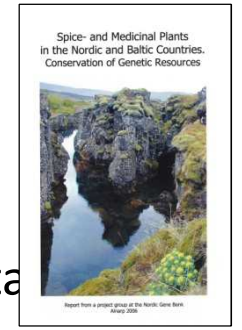


NordGen



	English	*Swedish*
Acorus calamus L.	Sweet-flag	kalmus
Arnica montana L.	Arnica	slåttergubbe hästfibbla
Helichrysum arenarium (L.) Moench.	Everlasting	hedblomster
Hypericum perforatum L.	St John’s Wort	äkta johannesört

NordGen



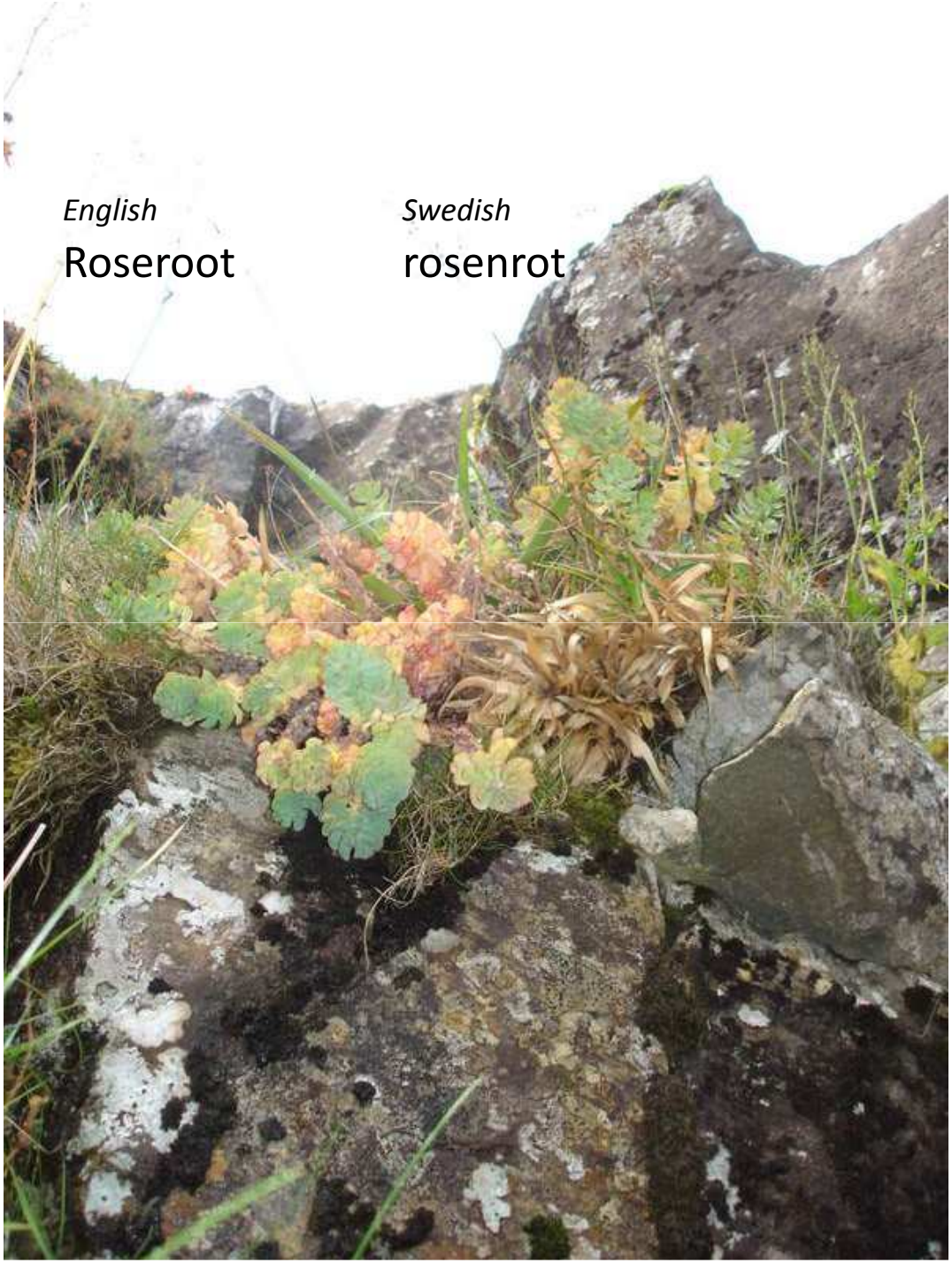
	English	*Swedish*
Origanum vulgare L.	Oregano	kungsmynta
Rhodiola rosea L.	Roseroot	rosenrot
Thymus sp.	Thyme species	timjanarter
Valeriana officinalis L.	Common Valerian	läkevänderot

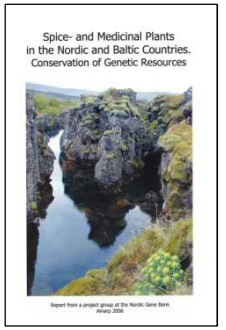
NordGen

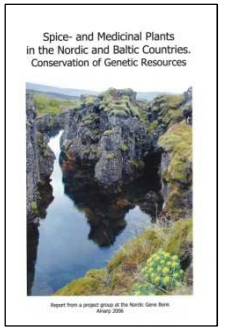
Rhodiola rosea L.

English
Roseroot

Swedish
rosenrot







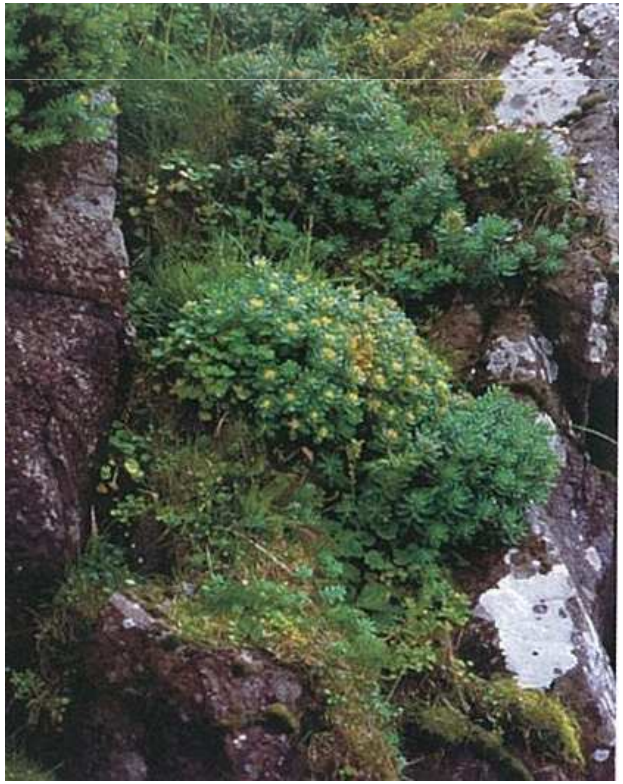
Rhodiola rosea L. Roseroot rosenrot

Botany and distribution

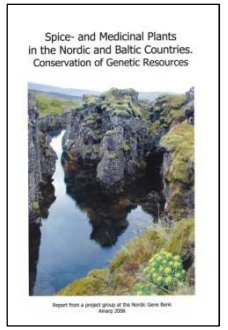
Branchless, fleshy leaves, monoic (male and female flowers on separate individuals), sometimes dioic,

Family Crassulaceae, several species but only R. rosea in our region

Indigenous of Iceland, Norway, Sweden, Finland



NordGen



Rhodiola rosea L. Roseroot rosenrot

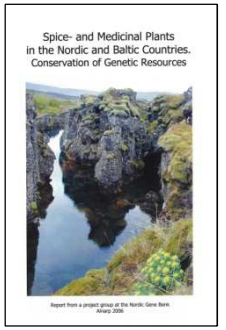
Medicinal use

Known as medical plant since 3000 years, scientific studies last 50 y

Documented ’adaptogene’ as is Korean ginseng.

Health improvement, stimulating and strengthening, alleviating pain

Several active compounds, eg
- Salidroside
- Rosavine
- Rosine
- Rosarine

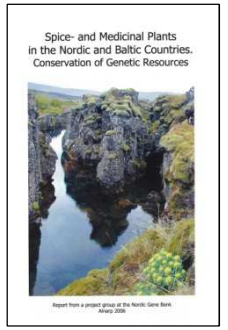


Rhodiola rosea L. Roseroot rosenrot

Future use, threats

Highly adapted to Nordic regions
+ roots and rhizomes used
+ growing demand
= vulnerable natural populations in danger

Rhodiola rosea L. Roseroot rosenrot



Collections

Some clone collections existed in Norway and Finland before SPIMED

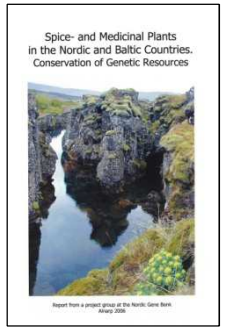
SPIMED extended and established clone collections, status 2006:

Finland	23 accessions	MTT Agrifood Research, Mikkeli
Iceland	6 accessions	Botanical garden, Reykjavik
Norway	97 accessions	Norw. Crop Res. Inst., Hedmark
Sweden	16 accessions	former NGB (NordGen), Alnarp

Today NordGen conserves approx. 90 seed accessions with pending status

e.g. small seed samples, costly multiplication

NordGen



Rhodiola rosea L. Roseroot rosenrot

Characterisations, evaluations

SPIMED: Characterised accessions in the collections for developing descriptor list and detecting morphological differences.

DNA analyses
Norway – UMB, PhD thesis 2009, Abdelhameed Elameen
Sweden – NordGen/SLU, Master thesis 2010, M. Kylin

Various chemical analyses

PLANTE- OG MILJØVITENSKAP

Doktorgrad om rosenrot - Nordens ginseng

Even Bratberg

Rosenrot finnes viltvoksende i hele Norden og er kalt Nordens ginseng på grunn av de mange helsebringende effekter som planten er blitt kjent for. Men variasjon og innhold av ulike bioaktive stoffer har vært lite kjent.

Doktorgradsarbeidet til Abdelhameed Elameen har gått ut på å kartlegge den genetiske variasjonen hos to modellplanter, rosenrot og søtpotet. Avhandlingen har tittelen: "Fenotypisk og molekylær diversitet i klonsamlinger av rosenrot (*Rhodiola rosea* L.) og søtpotet (*Ipomoea batatas*)".

Rosenrot vokser over hele landet fra kysten til høyfjellet. Bildet er fra Kongsvold på Dovrefjell. Foto: Even Bratberg

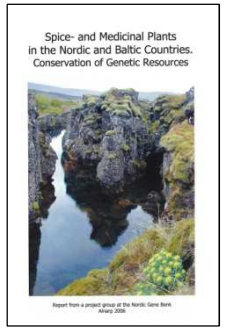
Innsamling av kloner. Rosenrot er en flerårig plante som blir 10 – 25 cm høy og vokser i tette tuer. Den har en tykk jordstengel som dufter rose når den deles. Undersøkelsen baserer seg på en innsamling av rosenrotplanter fra ulike steder i landet, fra kyst, fjell og innland. Tiltaket ble gjort av Bioforsk Øst bl.a. gjennom et naturprogram på radio, og fikk stor oppslutning og spredning. Karakteriseringen av 95 av disse ulike klonene hadde som tilleggsmålsetning å identifisere kommersielt verdifulle individer. Søtpotet fra Tanzania var også med som modellplante i dette doktorgradsarbeidet, en art som allerede har en lang tradisjon som en vegetativt formert matplante.

Stor variasjon. Undersøkelser viste stor genetisk variasjon mellom klonene og det kunne være forbausende stor genetisk ulikhet mellom kloner fra samme område. Likeledes varierte innholdet av bioaktive stoffer på samme måte. Alle de fem mest kjente bioaktive stoffene fantes i alle klonene, men enkelte kloner inneholdt betraktelig høyere mengder rosavin, rosin og salidrosid enn det som tidligere er funnet hos rosenrot, noe som kan vise seg å ha stor farmakologisk verdi. – Den store variasjonen en fant både genetisk og i innhold av bioaktive innholdsstoffer, bør være ett godt utgangspunkt for et foredlingsprogram i rosenrot, mener **Abdelhameed Elameen.**

Abdelhameed Elameen (46) har en meget internasjonal bakgrunn. Han er født i Sudan, har BSc i plantevitenskap fra universitetet i Alexandria i 1997 og Master fra UMB i 2000. Han er nå bosatt i Norge hvor han er forsker ved Bioforsk Plantehelse med genetisk diversitet, genetikk og bioteknologi som spesialområder. Han begynte som doktorstipendiat i 2005 med prof. Odd Arne Rognli, UMB og forskningssjef Sonja Klemsdal, Bioforsk som veiledere.

Abdelhameed Elameen har undersøkt genetisk variasjon hos rosenrot, en plantearт som har vært brukt i folkemedisinen i mange land. Foto: Even Bratberg

NordGen



Rhodiola rosea L. Roseroot rosenrot

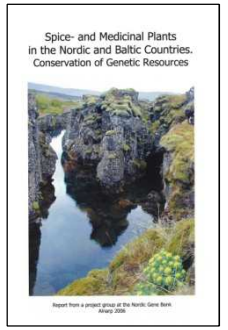
Recommendations

Develop storage of seeds

Carry out more collecting missions in Finland, Iceland and Sweden, as well as Greenland, Svalbard, Faroe Islands

Develop guidelines for cultivation for all Nordic-Baltic countries

If needed, develop guidelines for non-destructive harvest of natural populations.



Rhodiola rosea L. Roseroot rosenrot

Recommendations...

Genebanks, national programs should cooperate with host institutes regarding documentation and evaluation of collections

Chemical analyses of active compounds in the collected material

Roseroot is a brilliant example
– Genetic diversity in our region can become valuable potential
– new products, new niches.

NordGen

Tranekaer Castle, S. Denmark

Relic plants tell stories

Survivors - old settlements, monasteries, ruins and other historical sites

May give valuable input to local food development, tourism and livelihood

Tranekaer Castle, S. Denmark

NordGen

Bernt Løjtnant and members of the WG for vegetables and MAP

Tranekaer Church, S. Denmark

Arum italicum Mill.
Italian lords-and-ladies

NordGen

NordGen

NORDREGIO
Nordic Centre for Spatial Development

A project starting autumn 2011:

Arctic historical plants- their conservation and use for future generations

Aim:

Survey – what knowledge is there?

Create a Nordic network of experts

A workshop – Strategies and action plan

What do we know? What do we need to know? How do we collect and conserve?

NordGen

Public call
for old
annual and biennial ornamentals

2010 –

NordGen WG Fruits, berries and ornamentals, in cooperation with national programs, NGOs, etc.

NordGen

Old survivors, herited seeds, old varieties from yesterday's commercial cut flower growers

Traceable back to **at least** 1970

Pilot start, continues...

Genetic resources in use

NordGen

Genetic resources in use – ongoing activities

KESKAS-project

FinE®

NordGen

Genetic resources in use – ongoing activities

Information and marketing

Increase interest and use

Part of the Norwegian national program

www.plantearven.no

NordGen

Genetic resources in use – ongoing activities

PROGRAMMET FÖR ODLAD MÅNGFALD

Grönt kulturarv®

www.grontkulturarv.se

NordGen

Genetic resources in use – ongoing activities

Old vegetables in cultivation and utilization anew

a cooperation between the Swedish national program and other actors incl. NordGen

Lena Nygårds and Jens Weibull
www.pom.info

NordGen

Genetic resources in use – ongoing activities

Old vegetables in cultivation and utilization anew

NordGen

Genetic resources in use – ongoing activities

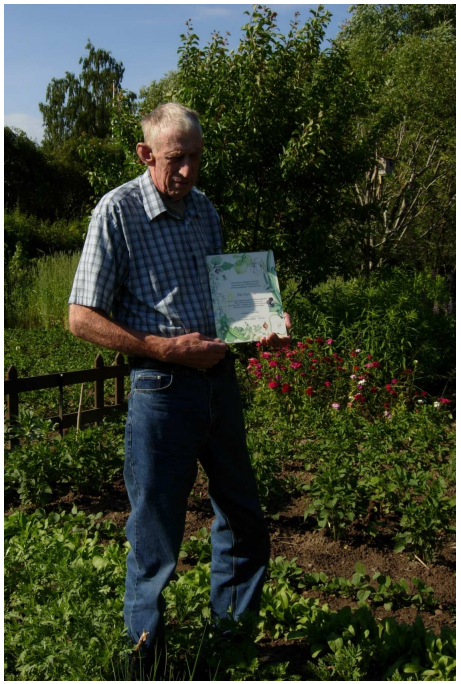
Old vegetables in cultivation and utilization anew

Grey pea Solberga

NordGen

Genetic resources in use – ongoing activities

Old vegetables in cultivation and utilization anew



NordGen

lena.ansebo@nordgen.org

http://www.nordgen.org