

ECRI 2007[★]


★ *european conference on research infrastructures*

Integrating European Diversity: an example from the European Native Seed Conservation Network

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&

Paul Smith, Head of the Millennium Seed Bank

ECRI 2007, Hamburg, 5th June 2007

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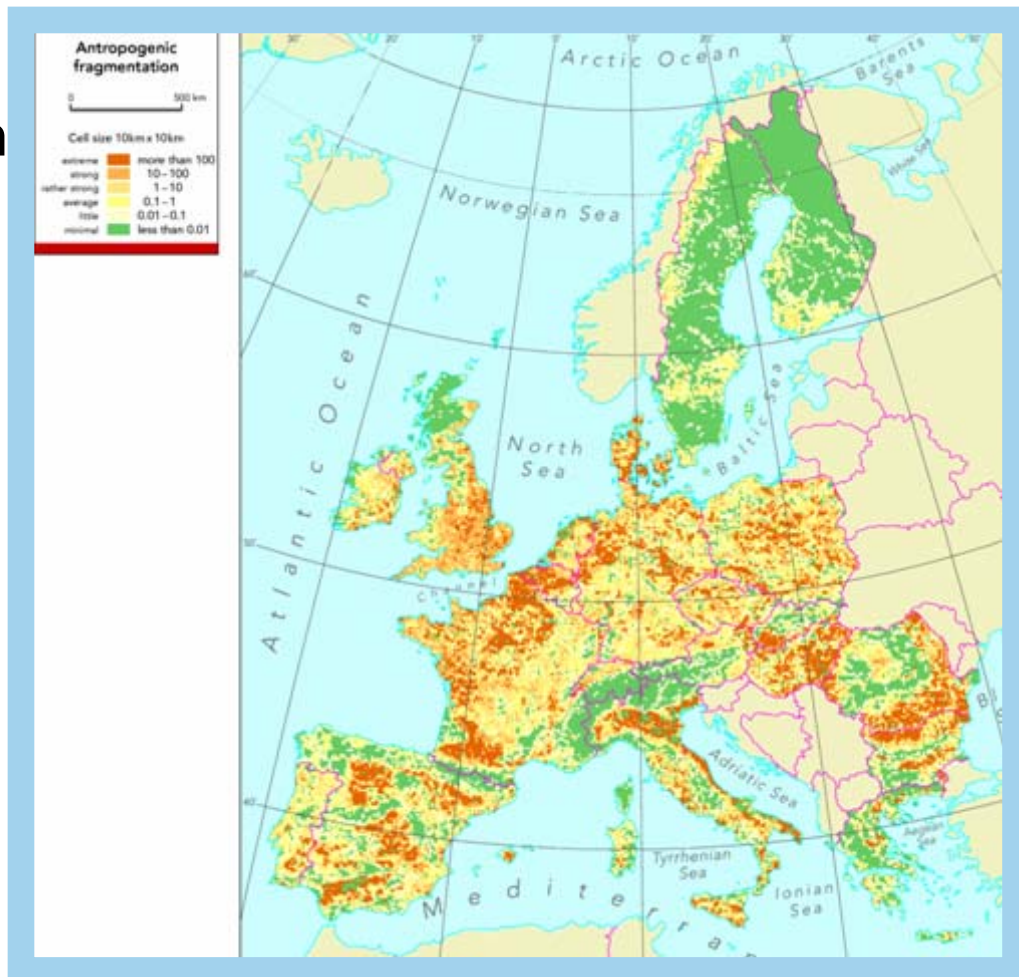
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Plants under threat: example landscape fragmentation

Anthropogenic
Fragmentation through
urbanisation,
infrastructure and
agriculture in different
parts of Europe.

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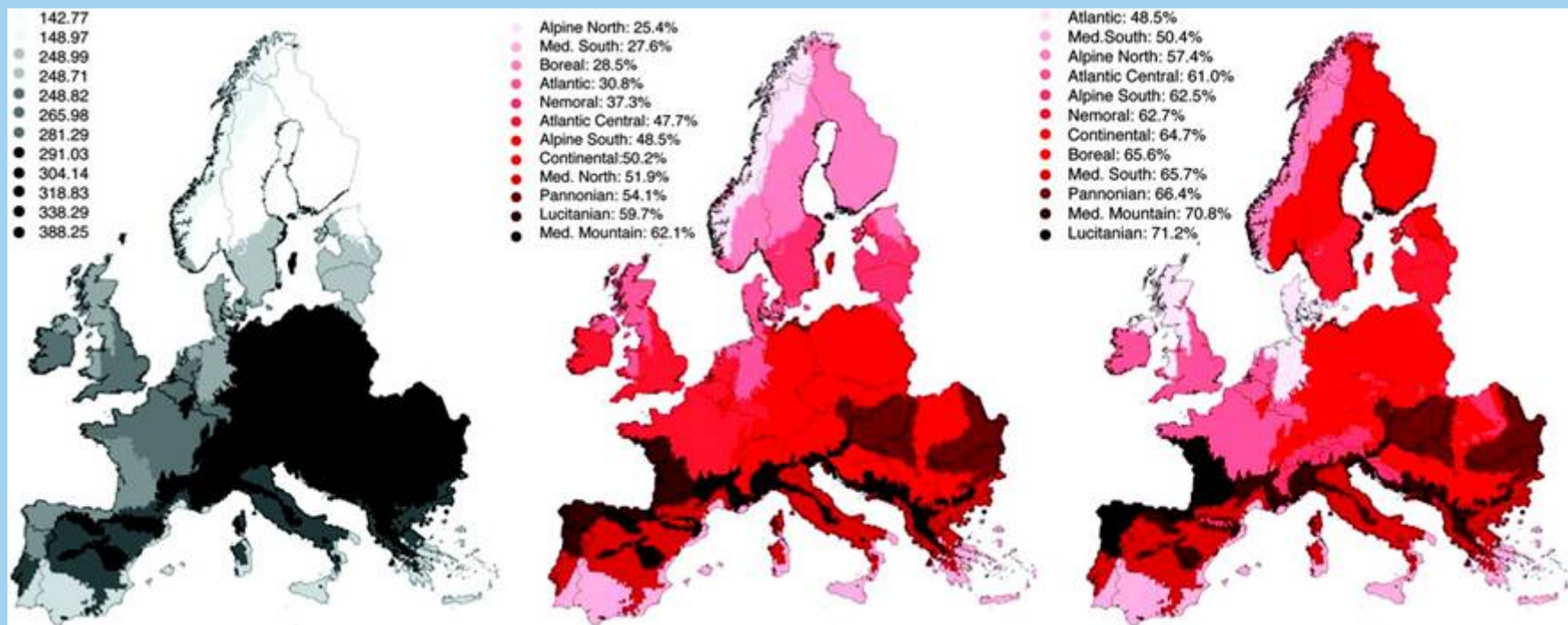


Plants under threat: example climate change - effects in Europe by 2080

Species richness

Species loss

Species turnover



Spatial sensitivity of plant diversity in Europe ranked by biogeographic regions
 Thuiller et al. (2005) Proc. Natl. Acad. Sci. USA 102, 8245-8250

Plants under threat: example climate change - effects in Europe by 2080

Worse case: no movement, worst climate scenario:

>50% of Europe's plant species vulnerable or threatened by 2080.

60% species loss in montane ecosystems predicted.



Seed Banks = Research Infrastructures for the long term, low cost storage and use of Europe's plant diversity.

Insurance against threats *in situ*

Most importantly, seeds can be used for conservation actions and high impact research



Seed collections and associated germination protocols enable research and exploitation of plant genetic resources in agriculture, horticulture, forestry and habitat repair – **all vital industries in the context of sustainability and human adaptation to climate change.**



Developing C4 photosynthesis
in crop species

C4 plants account for 20-30%
global terrestrial productivity
but are only 3% of
angiosperms

Washington State University,
Pullman

MSB supplied 32 seed
collections of 13 genera of C4
families for screening for C4
photosynthesis without Kranz
anatomy.



Oryza sativa L.

Reintroduction of *Atriplex* spp.
in Tunisia

INRGREF National Institute of
Research in Rural
Engineering, Water and
Forests

The MSB has supplied two
species of *Atriplex* for
experimental investigation and
reintroduction



European Seed Banks hold 35% of Europe's wild flora

36,595 accessions, representing
5,200 taxa (4,500 species, 700
subspecies)

1,770 species provisionally listed
as threatened (IUCN categories)
= 51% of European threatened
flora

BUT: Representation of genetic
diversity within species is
generally low, and quality of
collections very variable.



ENSCONET European Native Seed Conservation Network

- Funded by the European Commission as a Research Infrastructure Activity in Research FP 6
- First phase Nov 2004 - Oct 2009
- Initiated and co-ordinated by the Royal Botanic Gardens Kew (UK)
- **homepage: www.ensconet.eu**



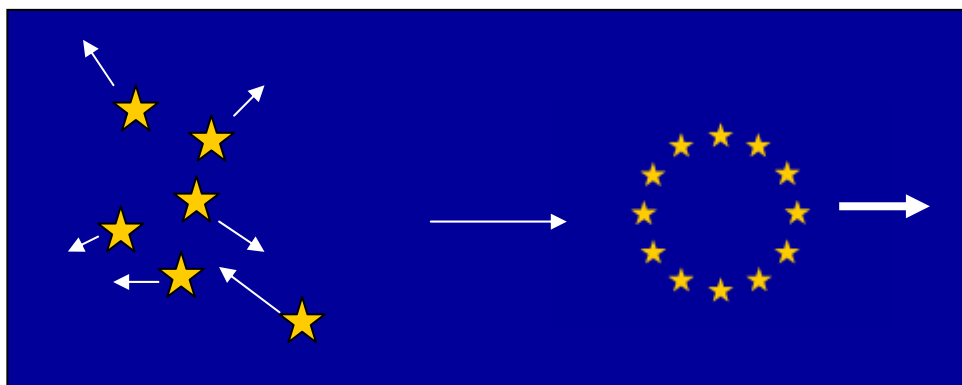
ENSCONET: Project purposes

Improved quality, co-ordination and integration of European seed conservation practice, policy and research for native plant species

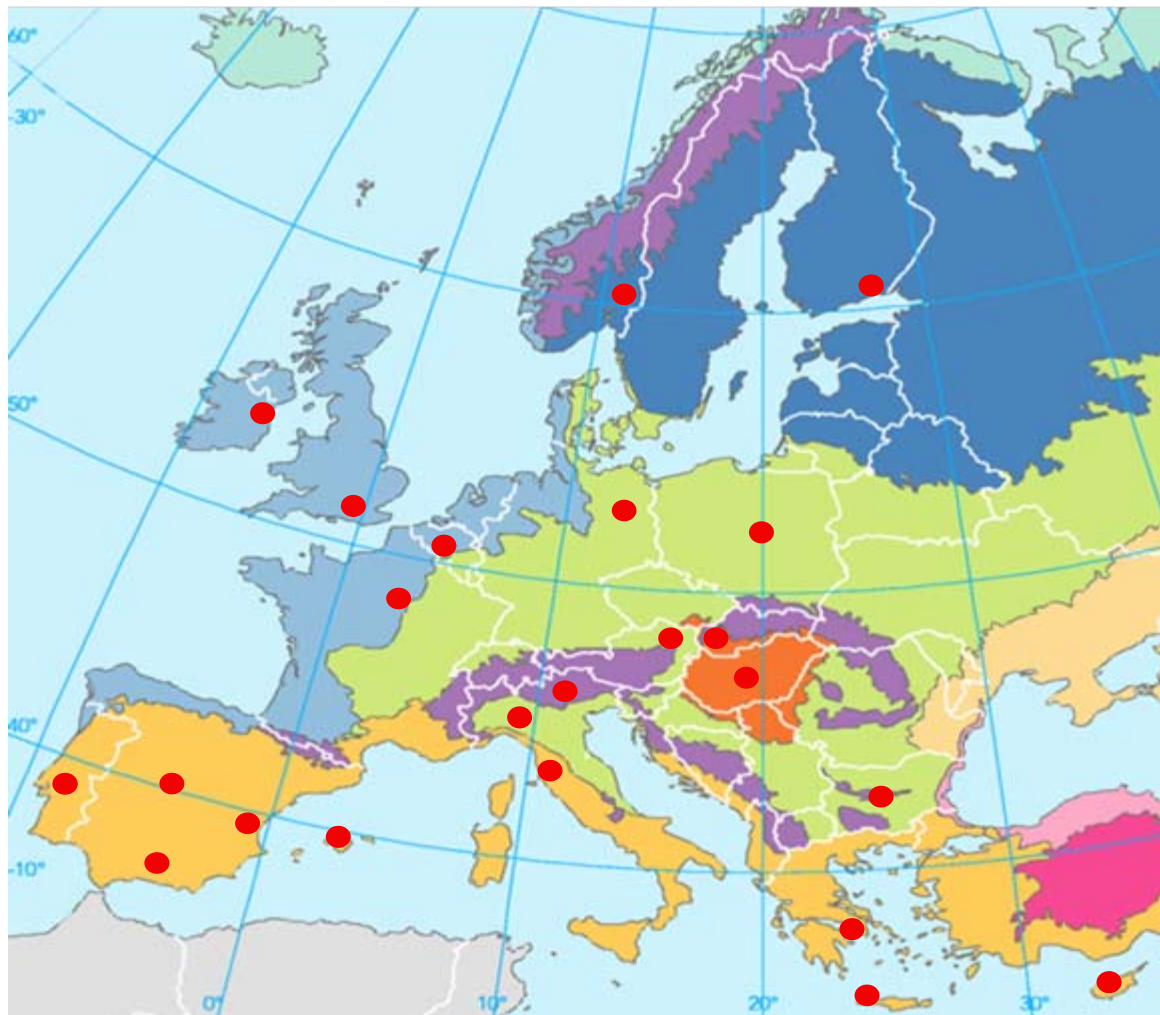
To assist EU conservation policy and its obligations under the Convention on Biological Diversity and the Global Strategy for Plant Conservation



ENSCONET: Project purpose: bring together isolated activities to produce maximum positive effect



- 24 European institutions as full members + 3 associate members, covering 9 bio-geographical regions
- 20 with seed banks for native species; 4 with associated interest
- Seed banks range in experience (2 to 41 years)
- Local, national, regional remit



Aim: define and apply best practice methodologies across Europe

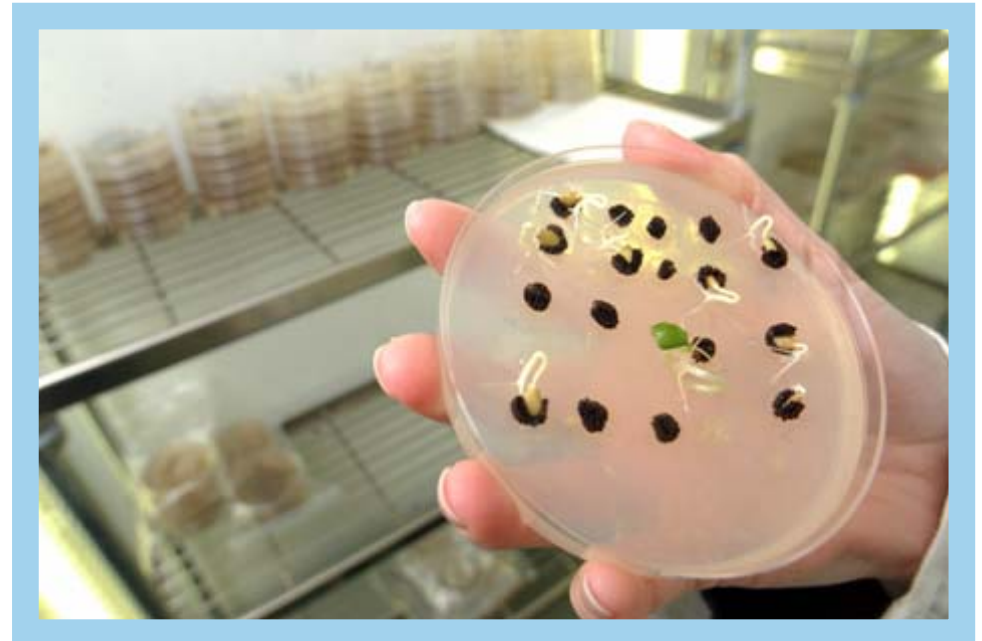
Four Activity groups:

Collecting

Curation

Data Management

Dissemination



Collecting

- List of European plant species
- Baseline of species in European seed banks
- Prioritised list of species for collection (“target species”) in all bio-geographical regions
- Define common high level seed collecting protocol



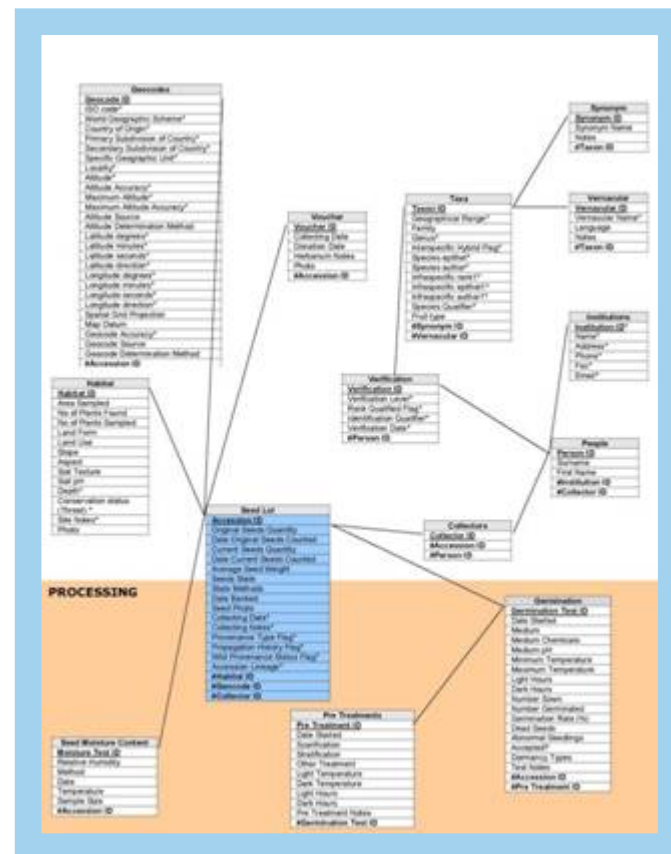
Curation

- Enhanced quality / security of seed conservation for native species within Europe
- Baseline documentation on facilities available
- Agreed best practice common curation protocols
- Sharing expertise / facilities



Data Management

- Facilitate data exchange
- Common protocol for recording seed germination data
- Data management system:
 - relational database structure
 - support consistent data entry
- Virtual European native species seed bank giving easier access to researchers



Dissemination and knowledge sharing



EUROPEAN NATIVE SEED CONSERVATION NETWORK

What is ENSCOHET?

ENSCOHET (European Native Seed Conservation Network) currently comprises 18 partners from 13 countries participating in an on-going project of Europe's bio-geographical regions. It is a Conservation Action funded under the European Union's 6th Framework Programme. The project links to other relevant national and European interests and comprises a wealth of seed banking experience.

Its purpose is the improved quality, availability and integration of European seed conservation practice, policy and research for native plant species, to meet EU conservation policy and its obligations to the Convention on Biological Diversity and its Global Strategy for Plant Conservation.

Which are its objectives?

- The development of integrated seed collecting programmes for all European bio-geographical regions, for native plant species of conservation and sustainable use value.
- Enhancement of the quality and security of the seed conservation for native species through implementation of a network achieved by sharing of expertise and facilities.
- Provision of a virtual European seed bank for wild-collected native species.
- To provide seed conservation managers, researchers, policy makers and other relevant organisations with information and understanding of ENSCOHET's work and its results.

Why is biodiversity increasingly important?

Biodiversity is the variety of life in every form, including genetic variation within and between species, and ecological diversity. It represents millions of years of evolution. However, by the end of the century, perhaps half of all species may be irretrievably extinct. Global warming could also have a serious impact on biodiversity. As a complementary strategy to protecting plants in their natural habitats, genetic conservation is essential to play a vital role in combating the irreversible loss of species diversity by securing seeds away from where diversity may be threatened in the wild. Long-term seed storage is cost-effective. It enables samples to be made available for reproduction and research many years (generally centuries) from now.

www.enscohet.com

Summary of major outputs

- Common high level standards for collection and curation
- Established and running seed collecting programme for all biogeographical regions to improve RI
- Database with access from outside the network
- Information on dormancy and storage behaviour available
- Access to seed samples for others (for research and restoration)
- Sustainability and long-term relationships among the network members
- Prospects for attracting financial resources to secure future collecting programmes and high profile research projects

Outlook

To further integrate seed conservation and research across Europe, it is essential to broaden the network and to expand its activities

→ enable the collection, safe storage and utilisation of all European wild plant species



‘If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.’

Aldo Leopold. *Round River*.
Oxford University Press

