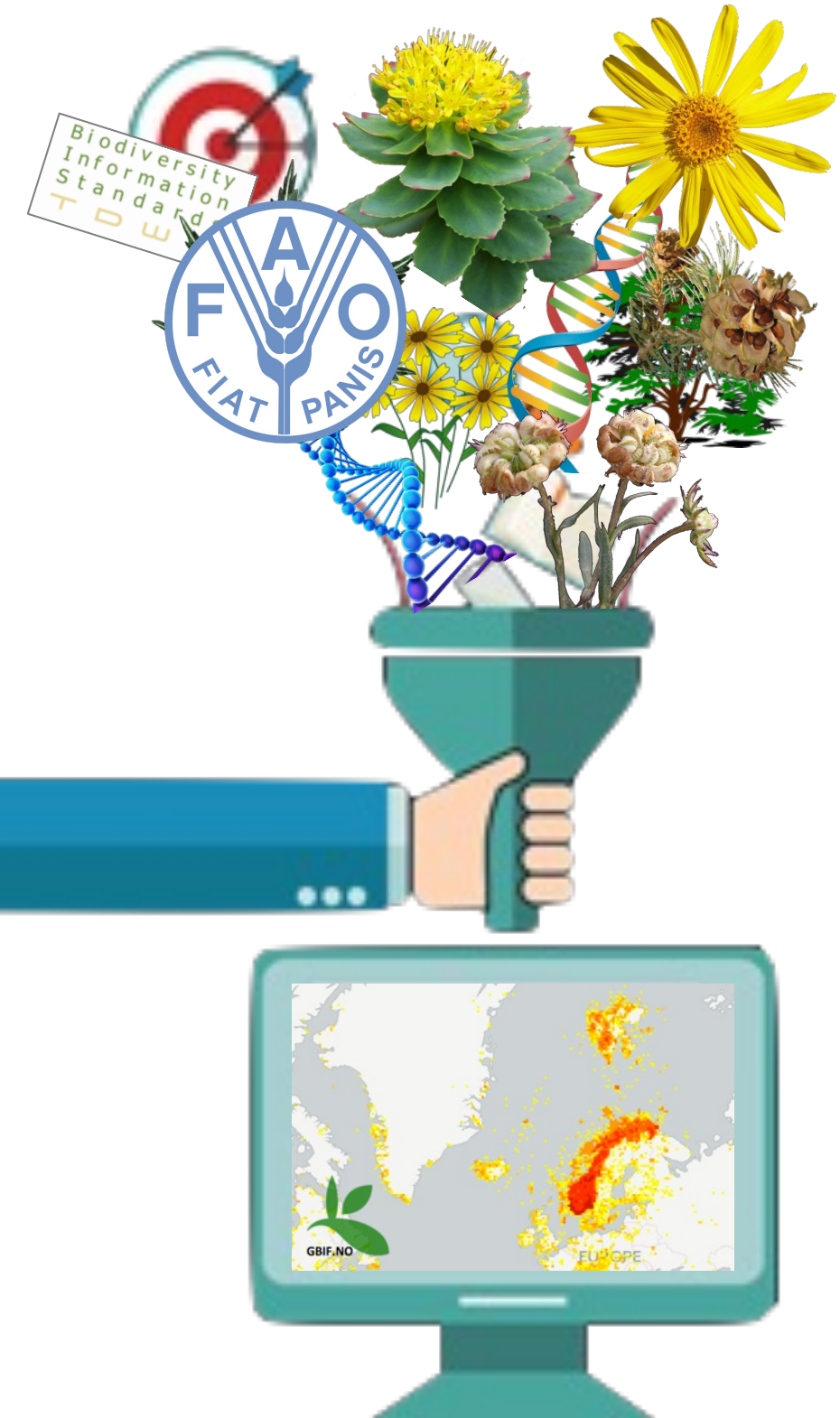


*GBIF fitness for use in **Agrobiodiversity***

Dag Endresen, Ph.D.
GBIF Node Manager for Norway

GBIF.no

UiO : Natural History Museum
University of Oslo

MY PAST EXPERIENCES

- **University of Oslo Natural History Museum**, GBIF Node Manager (since October 2012)
- **UN FAO**, the International Treaty on PGRFA, consultancy (August to October 2015)
- **Global Biodiversity Information Facility**, GBIF, Knowledge Systems Engineer (August 2011 to September 2012) – 1 year
- **Copenhagen University**, Faculty for Life Sciences, **Ph.D.** fellow Agrobiodiversity (2007 – 2011)
- **Bioversity International**, consultancy (2005 to 2009) – secondment from NordGen
- **Nordic Genetic Resource Center**, NordGen / Nordic Gene Bank (NGB), Database officer (1999-2002) → IT Manager (2003-2007) → Data Scientist (2007 to 2011) – 12 years

- ECPGR EPGRIS project team to build EURISCO (1999-2003)
- Global Crop Diversity Trust (GCDT) GeneSys advisory group
- FAO GLIS (DOI) – Core Advisory Group
- FAO CWR descriptors -- Scientific Advisory Committee

Food security is challenged by:

- Population growth
- Climate change

World human population (est.) 10,000 BC – 2000 AD.

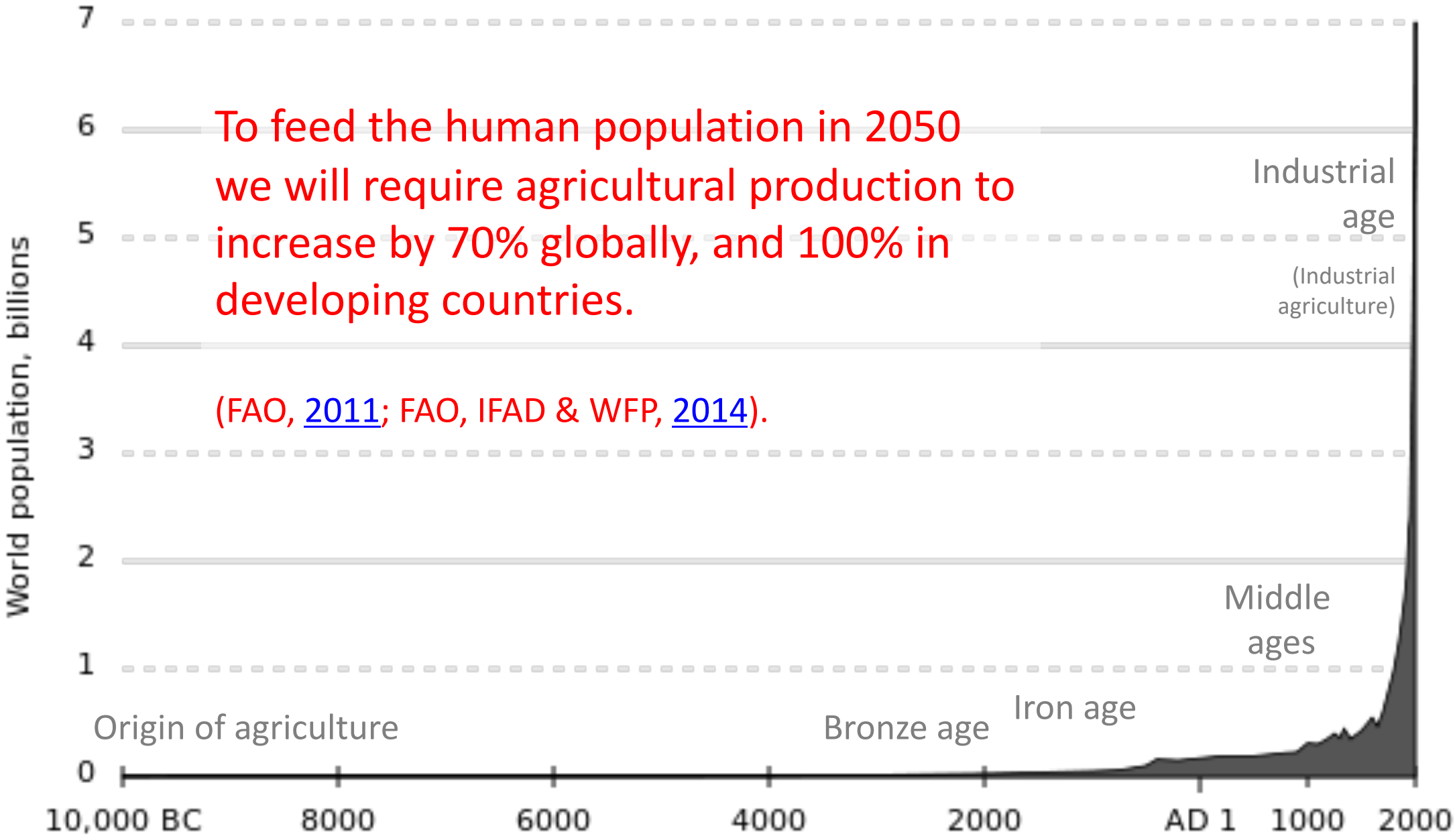
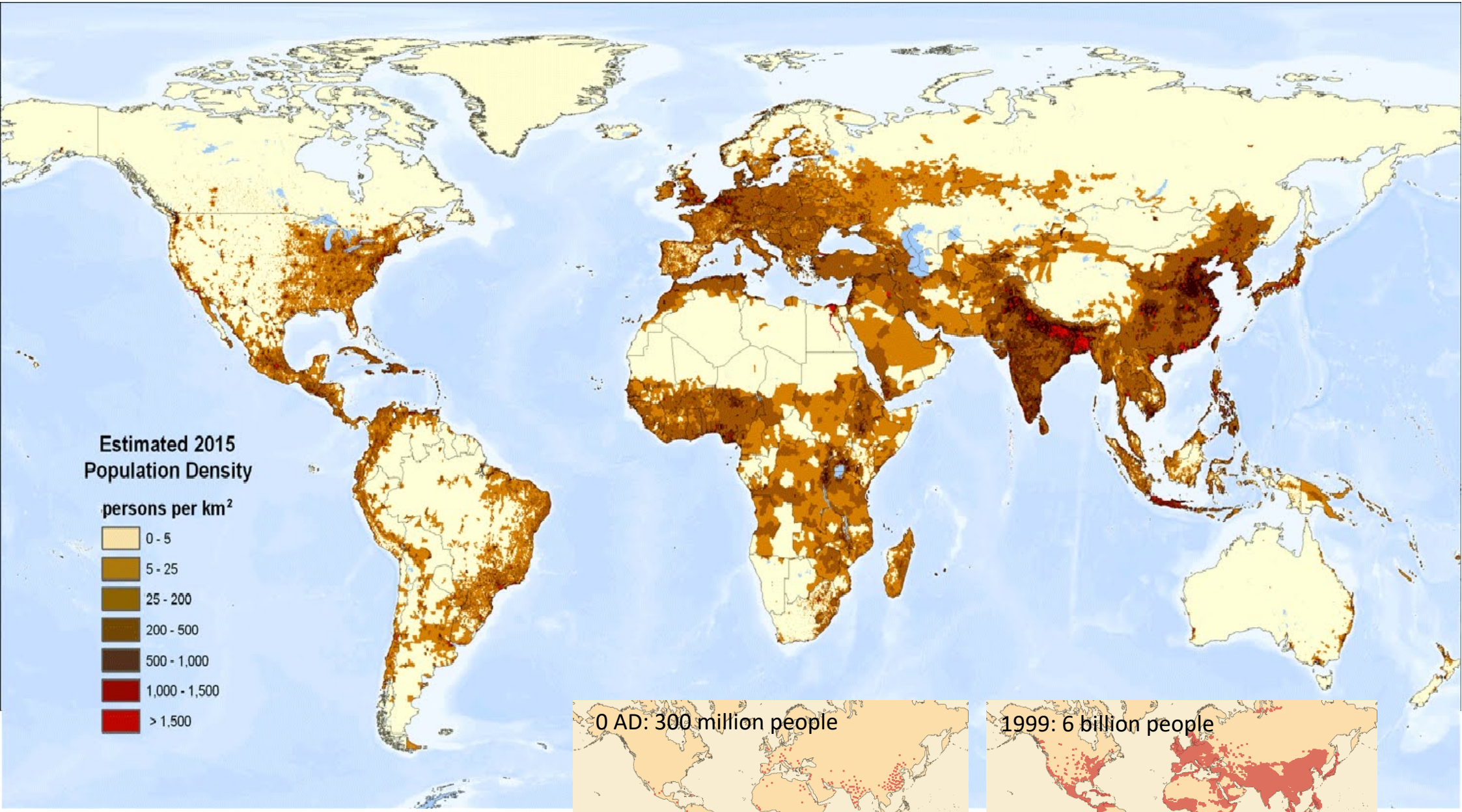


Illustration: Wiki Commons Public Domain.

FAO (2011). Looking ahead in world food and agriculture: Perspectives to 2050. . ISBN 978-92-5-106903-5 (p.272).

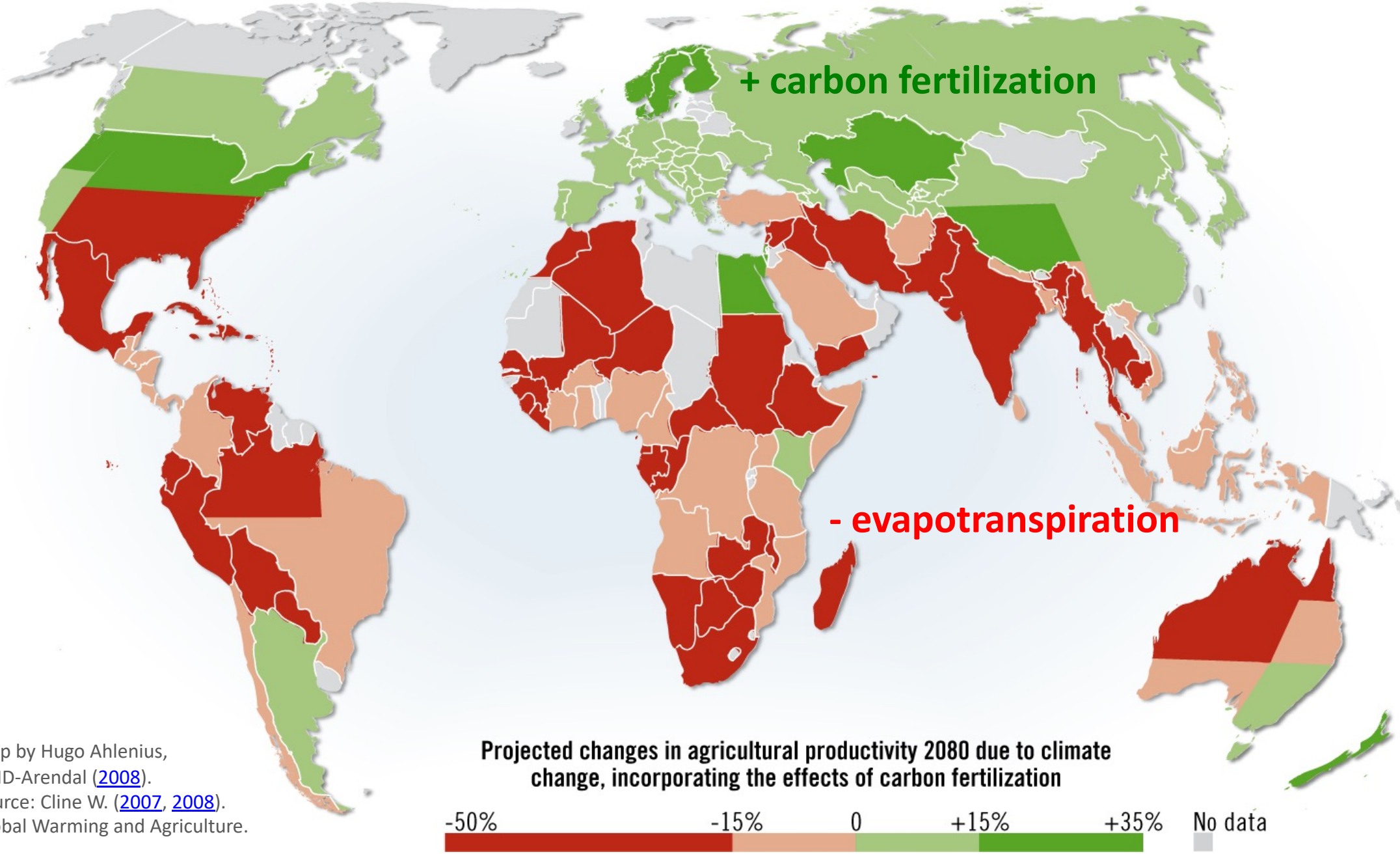
World population density (2015)



Map by Alex E, available at Ecoclimax.com (2016)

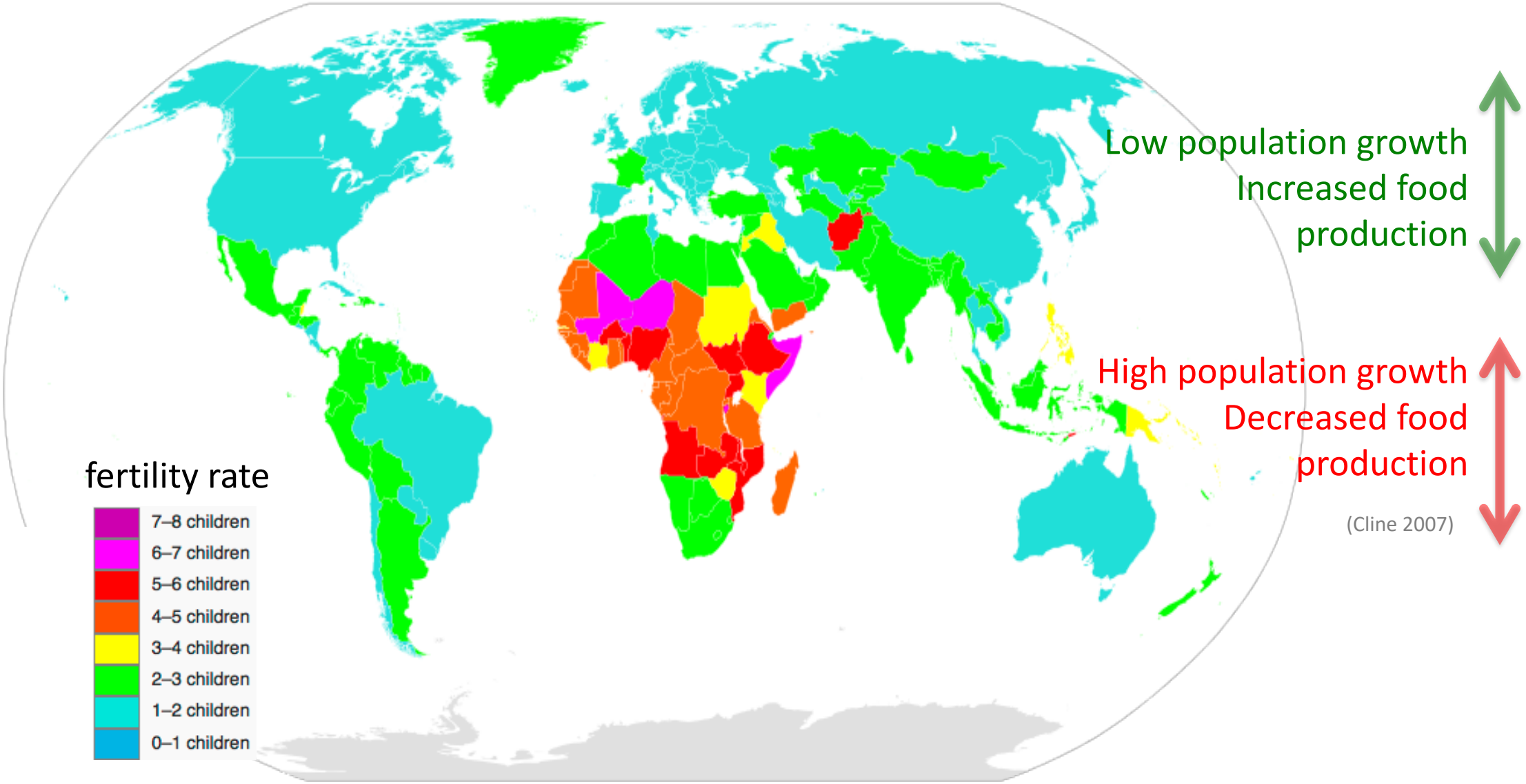
Projected impact of climate change on agricultural yields

Agricultural production will decrease by 2% each decade (IPCC AR5 WGII, 2014).



Map by Hugo Ahlenius, GRID-Arendal (2008).
Source: Cline W. (2007, 2008). Global Warming and Agriculture.

Population growth (total fertility rate)



Sea cale (*Crambe maritima* L.) at Spornes, Tromøy, Norway, July 2013, CC-by Dag Endresen.

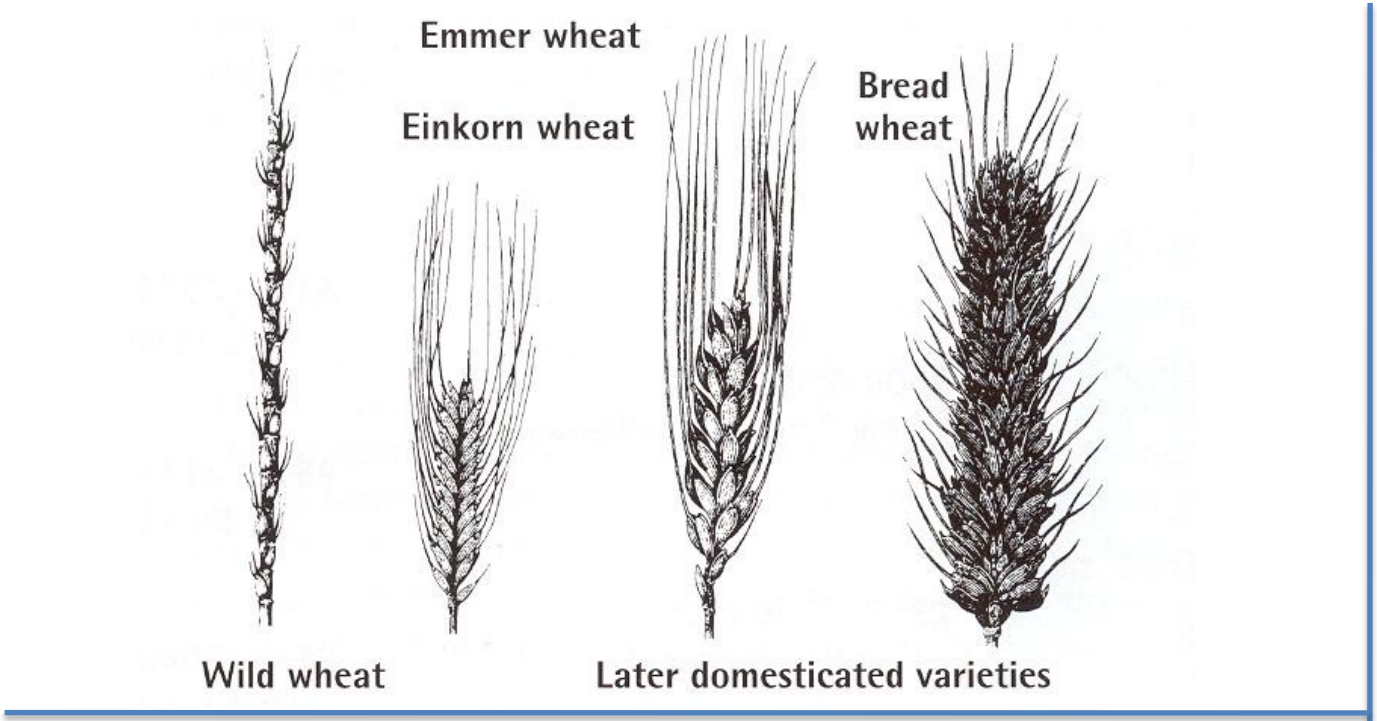
WE NEED CROPS:

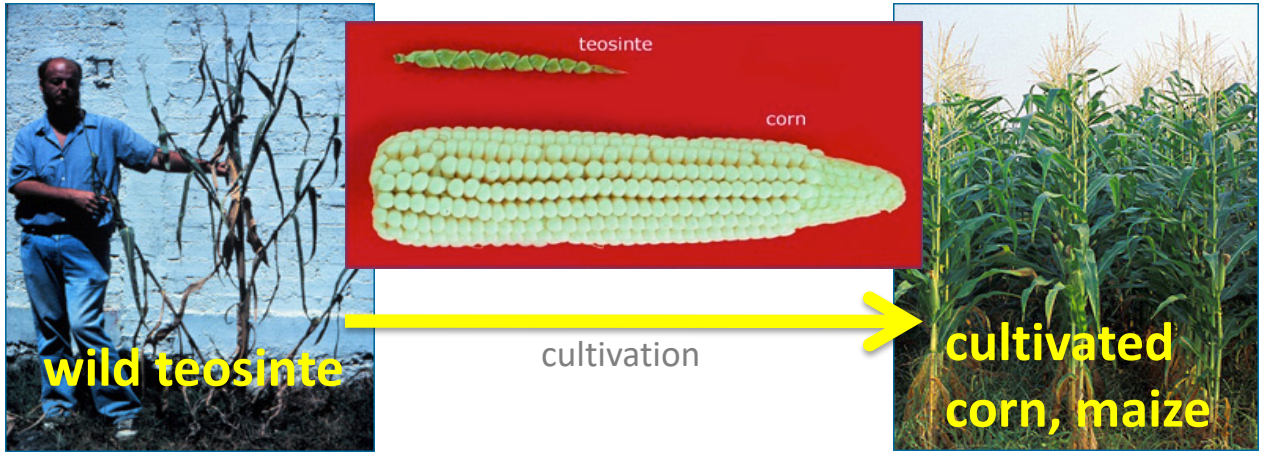
- with higher yields
- with higher nutritional value
- adapted to degraded lands
- adapted to changing environments

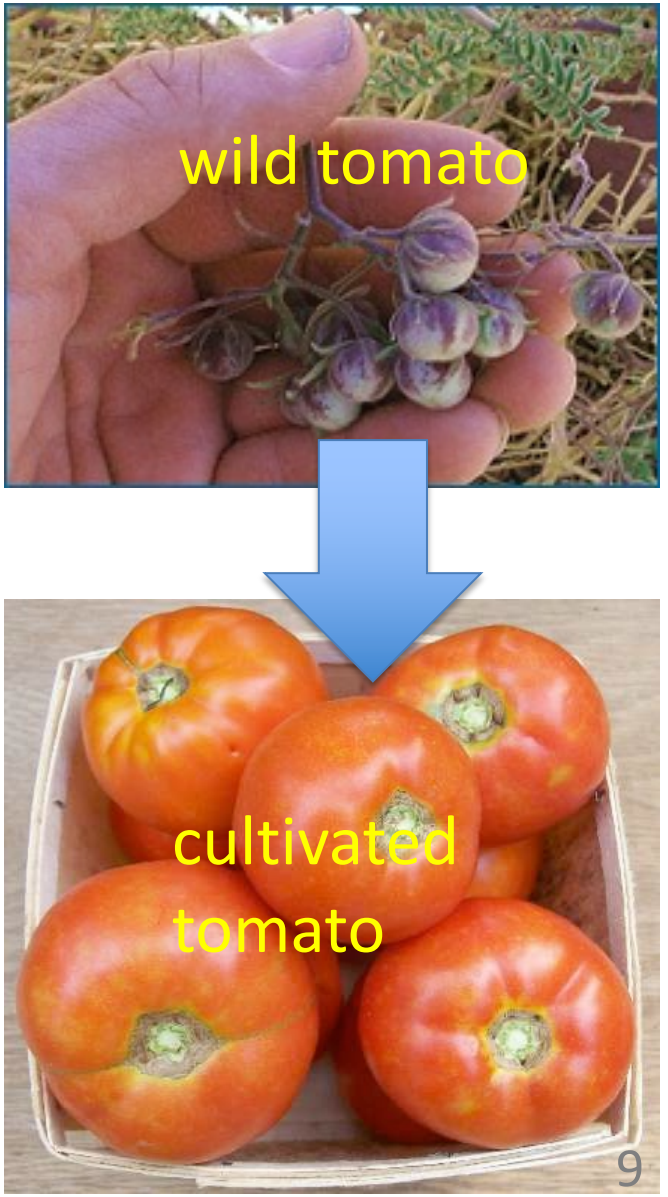
Untapped genetic diversity can be found in:

- **Traditional cultivars,**
- **Landraces, and**
- **Crop Wild Relatives!**

DOMESTICATION AND CULTIVATED PLANTS:
UTILIZING GENETIC POTENTIAL FROM THE WILD







WHAT ARE CROP WILD RELATIVES?

Crop wild relatives (CWR) are wild plant species closely **related to crops**.

They have an indirect use as **gene donors for crop improvement** due to their relatively close genetic relationship to crops.

They are an important socio-economic resource that **offer novel genetic diversity** required to maintain future food security.

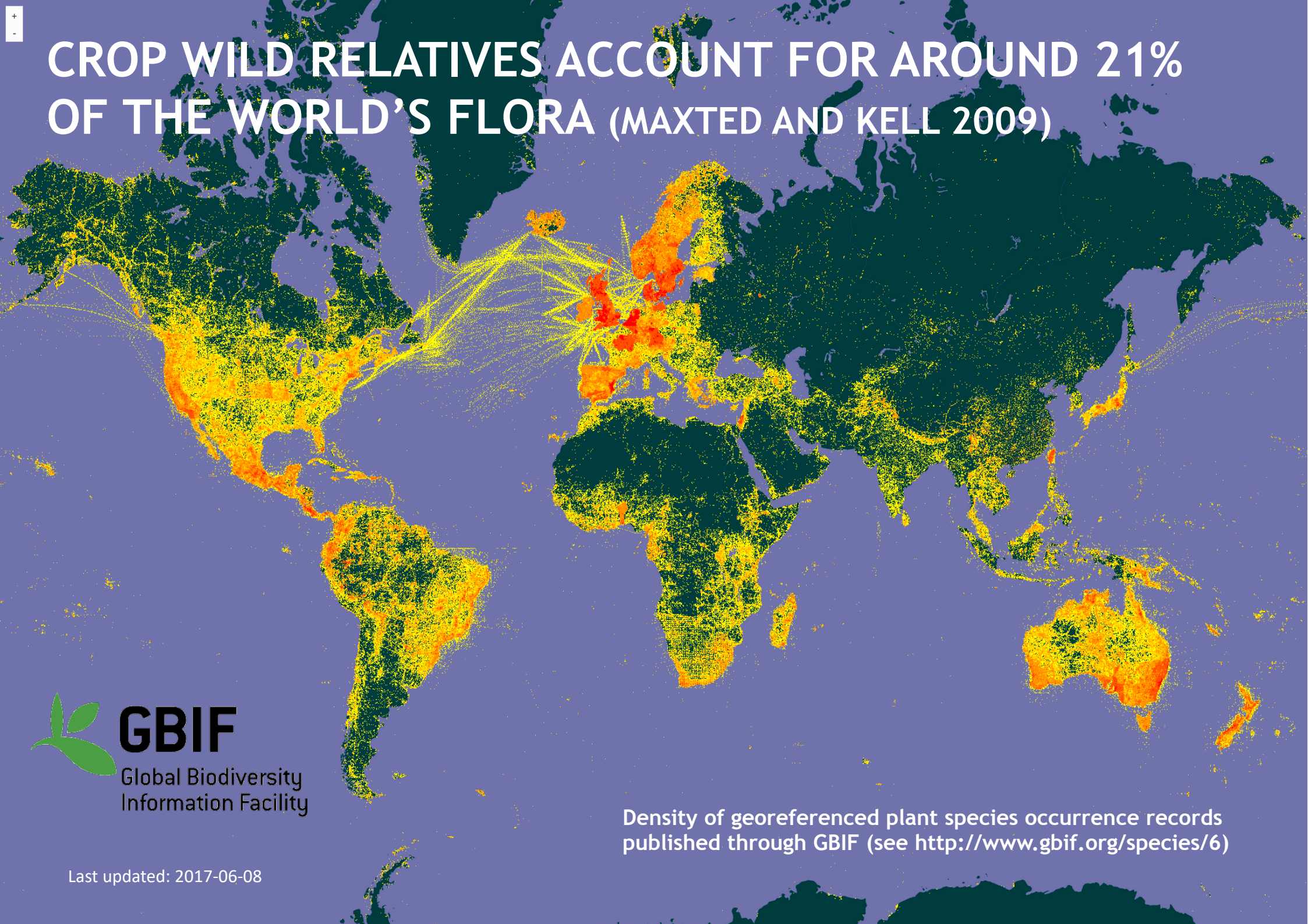
Broad definition (Maxted *et al*. 2006)
CWR = all taxa within the same genus as a crop

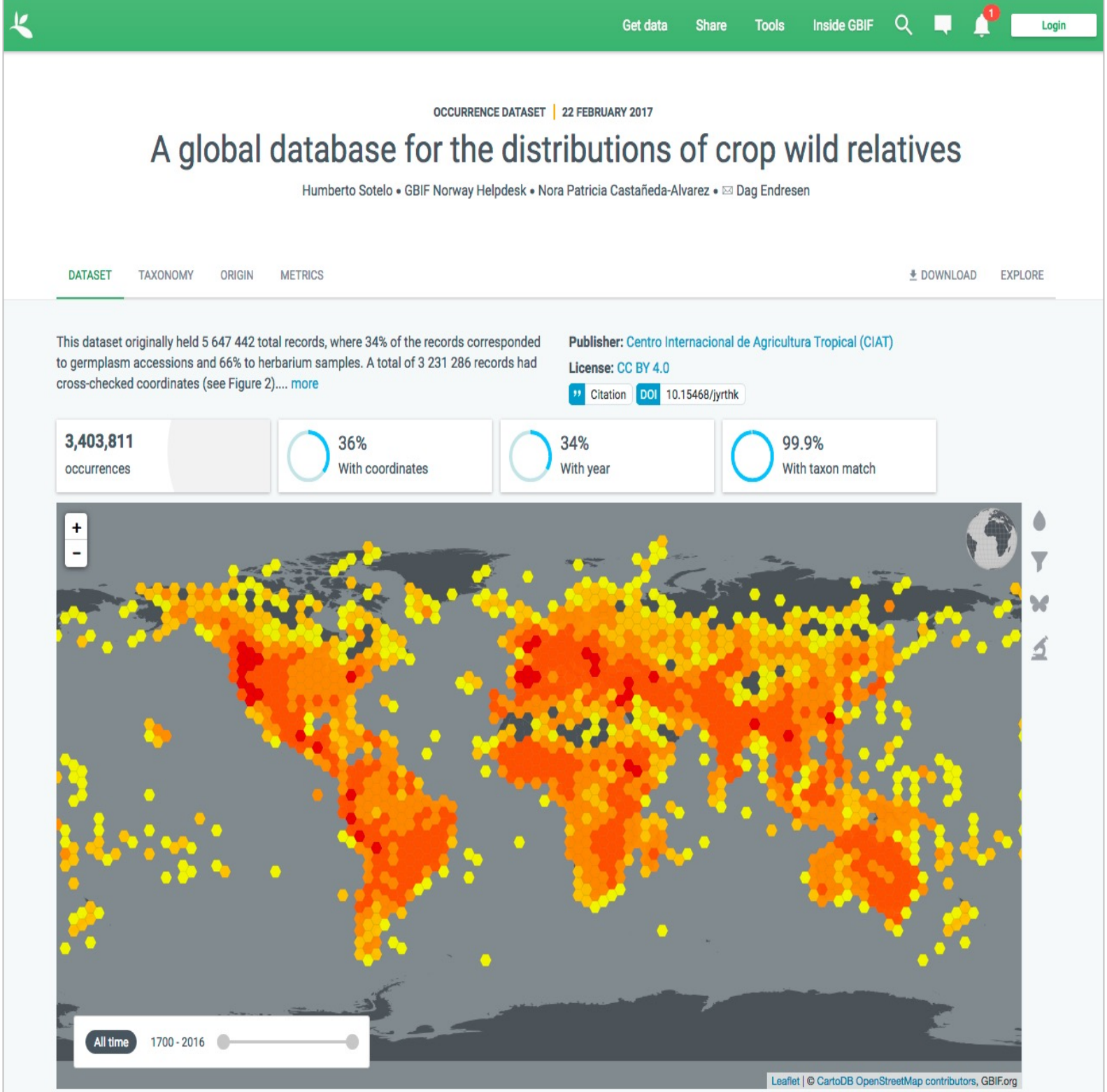
Maxted *et al*. 2006, doi:10.1007/s10531-005- 5409-6

Hare barley (*Hordeum murinum ssp. leporinum*) Sesimbra, Portugal April 2016 CC-BY Dag Endresen

Cultivated barley (*Hordeum vulgare* L.) June 2007, Gatersleben Germany CC-BY Dag Endresen

CROP WILD RELATIVES ACCOUNT FOR AROUND 21% OF THE WORLD'S FLORA (MAXTED AND KELL 2009)





The Global Crop Wild Relative **Occurrence** Database include data from hundreds of data sources – including GBIF

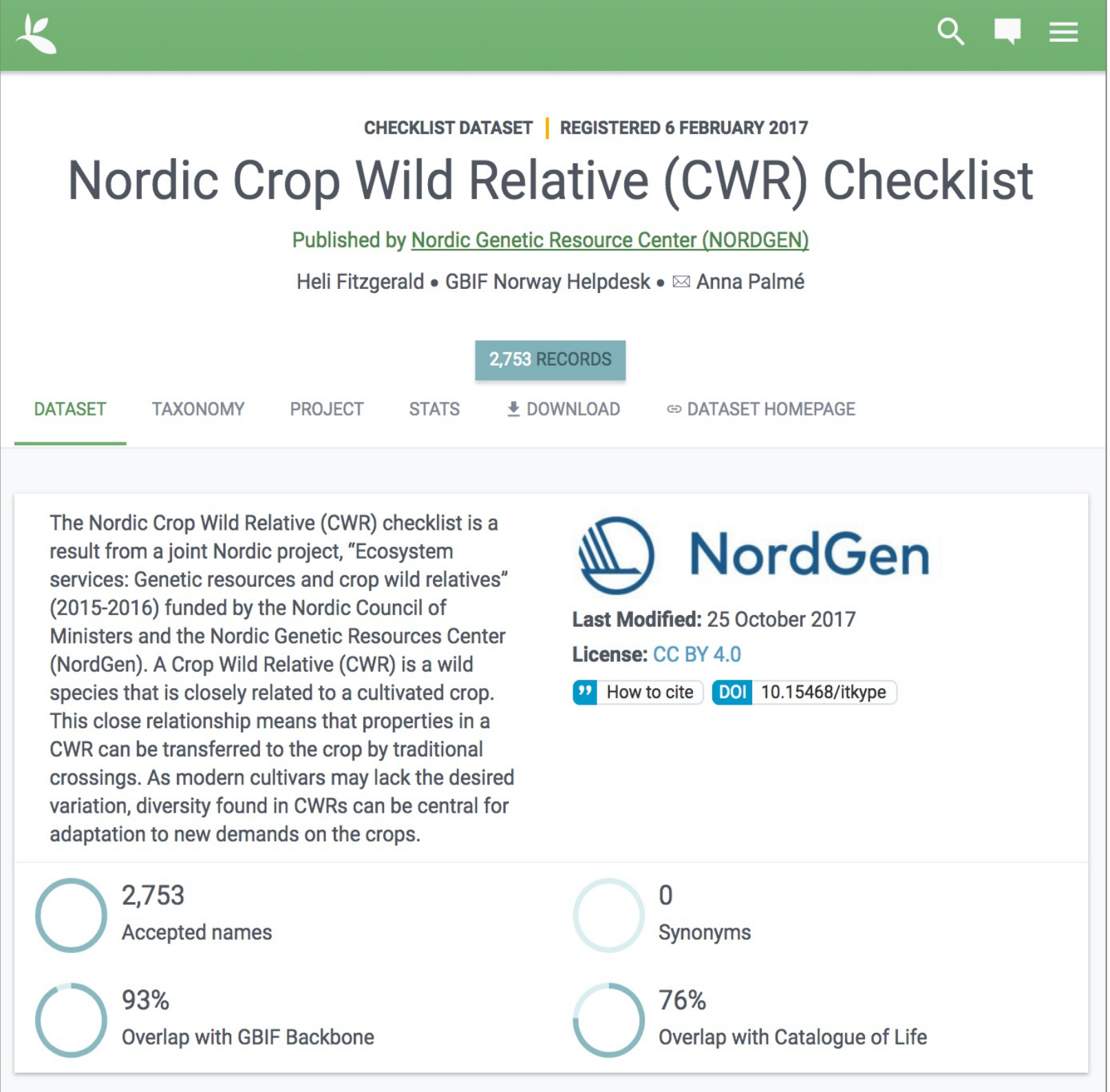
The CWR Database was published in GBIF (2016) (*excluding the data records originating from GBIF*)

doi:10.15468/jyrthk

Vincent *et al*.N (2013). A prioritized crop wild relative inventory to help underpin global food security. doi:10.1016/j.biocon.2013.08.011

Nordisk Ministerråd

Nordic crop wild relative conservation strategies



NordGen

The Nordic Crop Wild Relative (CWR) **Checklist** is published in GBIF (2017)

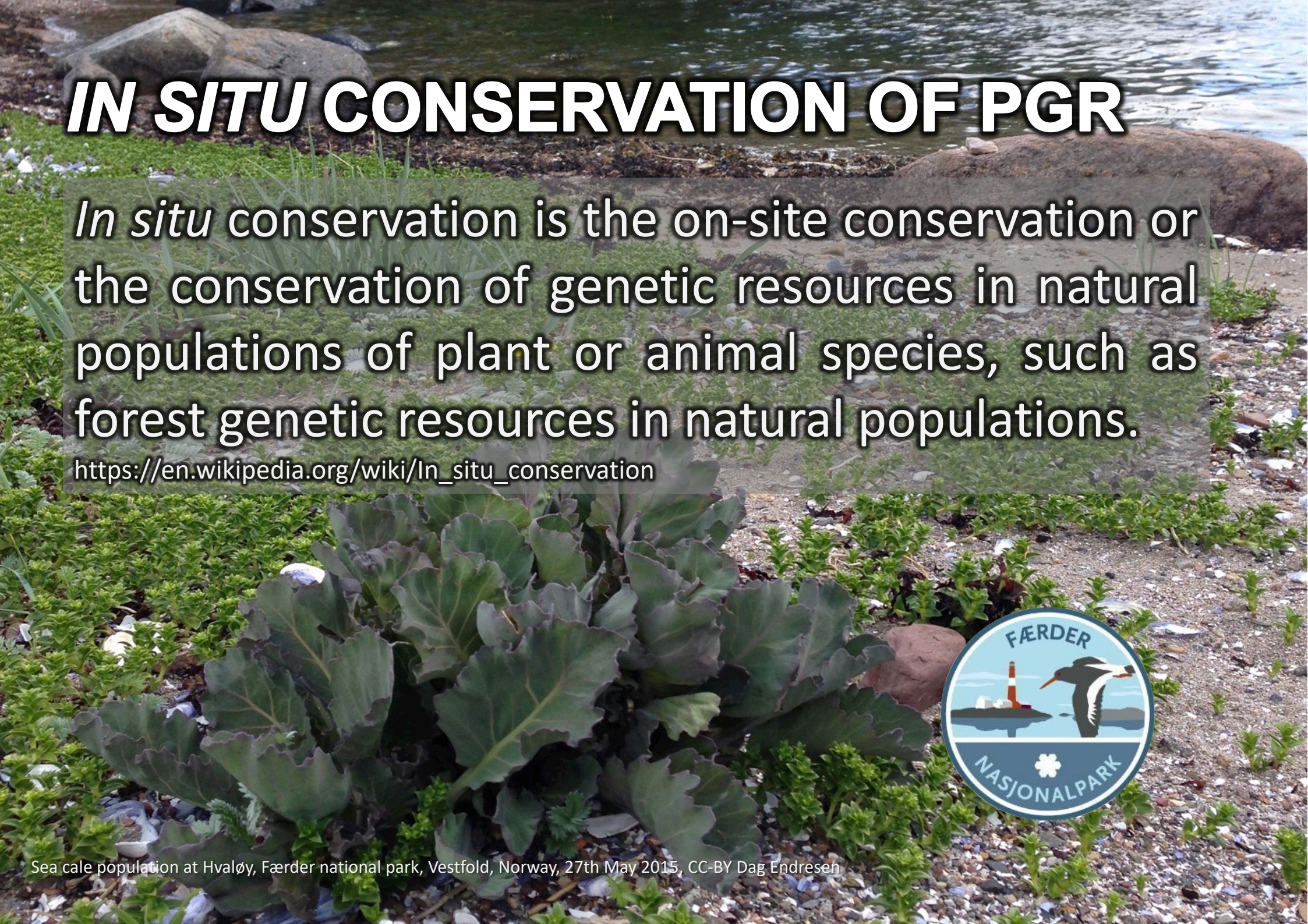
doi:10.15468/itkype

Nordic CWR conservation priorities are developed using GBIF-mediated data.

IN SITU CONSERVATION OF PGR

In situ conservation is the on-site conservation or the conservation of genetic resources in natural populations of plant or animal species, such as forest genetic resources in natural populations.

https://en.wikipedia.org/wiki/In_situ_conservation



Sea cale population at Hvaløy, Færder national park, Vestfold, Norway, 27th May 2015, CC-BY Dag Endresen

FÆRDER NATIONAL PARK – GENETIC RESERVE

Kap. 2.4 Planteliv og genressurser
Tanken om nasjonalparken som et genressursreservat er spennende selv om dette er uten forankring til noe lovverk. OF er som grunneier stolt av at øya Kløvningen er utvalgt som en av syv øyer i nasjonalparken som spesiell *in situ* bevaringslokalitet/genressursreservat og at øya fremover ønskes fulgt opp med grundige registreringer og overvåkning, jf vedlegg Færder nasjonalpark som genressursreservat.

Kommentar til Fylkesmannen i Vestfold, januar 2016 fra Friluftsrådet i Oslofjorden
https://www.fylkesmannen.no/Vestfold/Arkiv---Horinger/Forvaltningsplan-Farder-nasjonalpark/

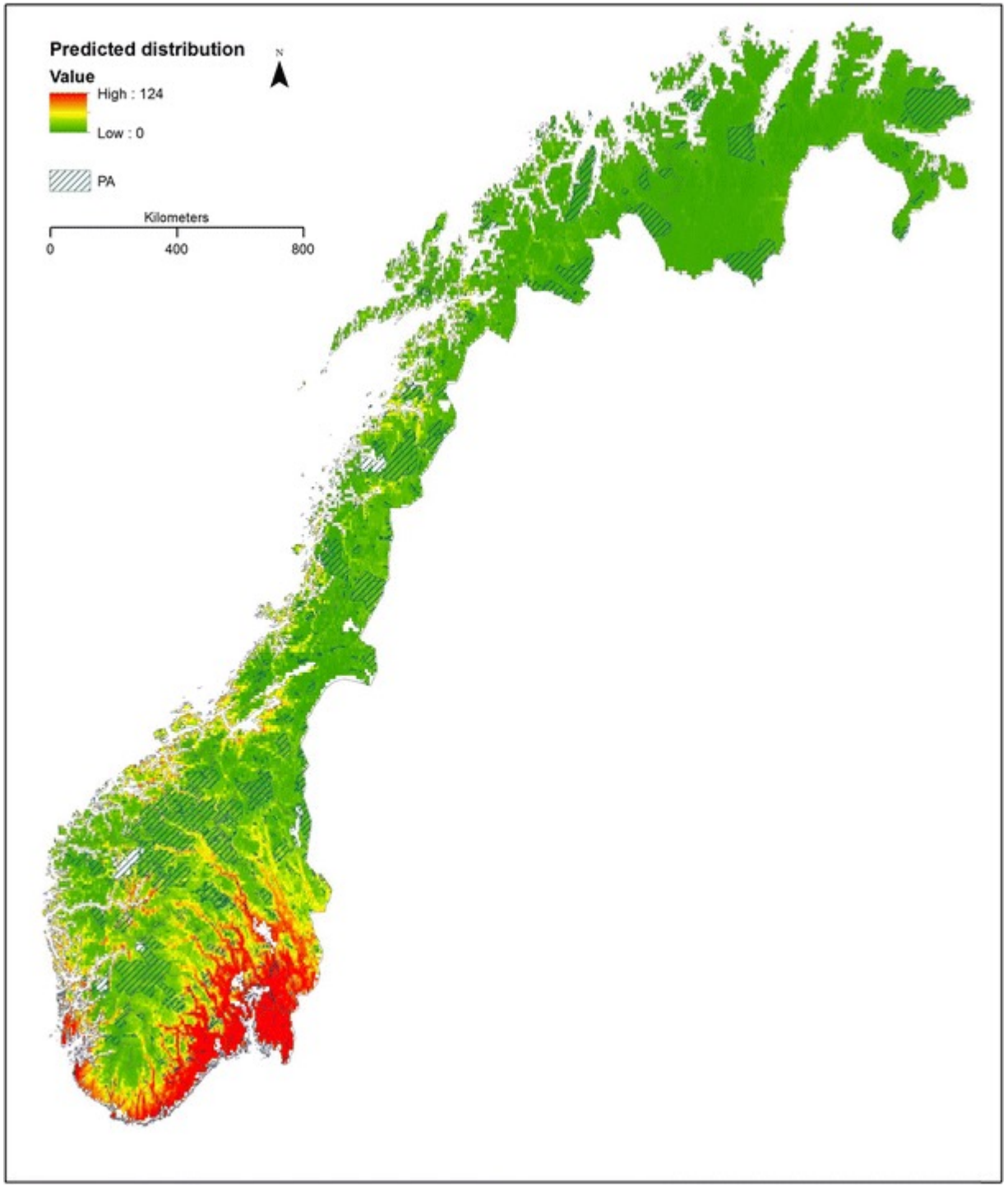


Figure. The predicted distribution of 187 priority CWR in Norway under the current climatic conditions. Red areas indicate taxon-rich areas with up to 124 taxa found there, and green areas indicate low taxon richness. Raster grid cell size 0.0416, approximately equal to 4 × 8 km2 (Philips *et al*. 2017)

CWR conservation in Norway

Development of a conservation plan for Crop Wild Relatives in Norway using CWR species occurrence data points from GBIF.

- Species richness of **201 priority CWR.**
- Based on **592,705 records** from GBIF.
- Oslo and south-east region have highest CWR taxonomic diversity.

Phillips J, Brehm JM, van Oort B, Asdal Å, Rasmussen M, & Maxted N (2017) Climate change and national crop wild relative conservation planning. *Ambio*. DOI:10.1007/s13280-017-0905-y

Phillips J, Asdal Å, Brehm JM, Rasmussen M, & Maxted N (2016) *In situ* and *ex situ* diversity analysis of priority crop wild relatives in Norway. *Diversity and Distributions* 22: 1112–1126. DOI: 10.1111/ddi.12470

Asdal Å, Philips J, & Maxted N (2013). Boost for crop wild relative conservation in Norway. *Crop Wild Relative* 9: 20-21. ISSN 1742-3694.

NIBIO NORSK INSTITUTT FOR BIOØKONOMI
UNIVERSITY OF BIRMINGHAM
GBIF.no

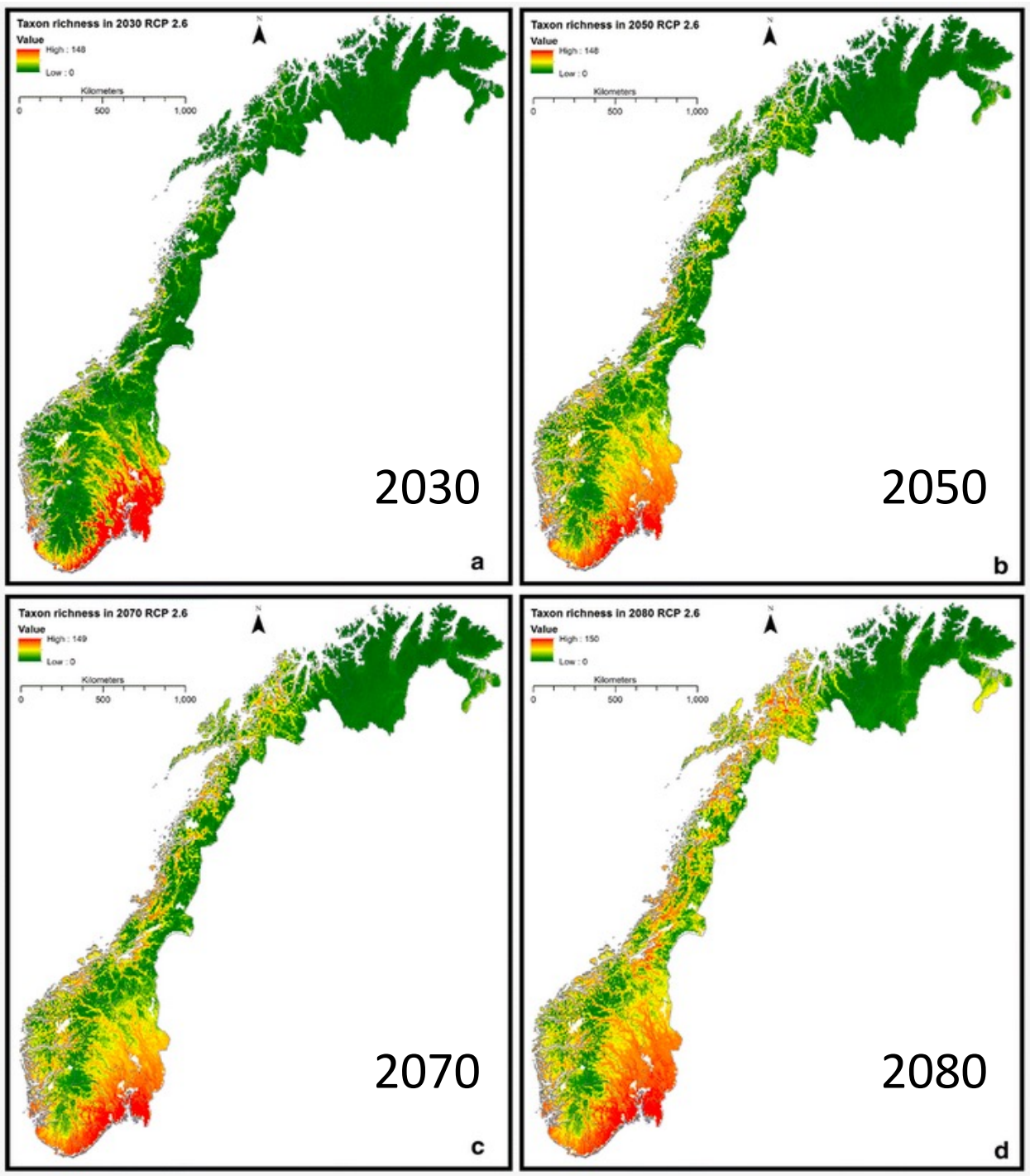


Figure. The average predicted taxon richness of 187 priority CWR in Norway under RCP 2.6 for the years **a** 2030, **b** 2050, **c** 2070, **d** 2080. Raster grid cell size 0.0416, approximately equal to 4 × 8 km^2 (Philips *et al*. 2017)

CWR conservation in Norway

Development of a conservation plan for Crop Wild Relatives in Norway with extracted CWR species occurrence data points from GBIF.

Phillips, J., Magos Brehm, J., van Oort, B. Asdal, Å., Rasmussen, M., Maxted, N. (2017) Climate change and national crop wild relative conservation planning. *Ambio*. DOI:10.1007/s13280-017-0905-y

Phillips, J., Asdal, Å., Brehm, J.M., Rasmussen M., Maxted, N. (2016) *In situ* and *ex situ* diversity analysis of priority crop wild relatives in Norway. *Diversity and Distributions*, 22, 1112–1126. DOI: 10.1111/ddi.12470

http://www.gbif.org/newsroom/uses/2016-phillips-et-al

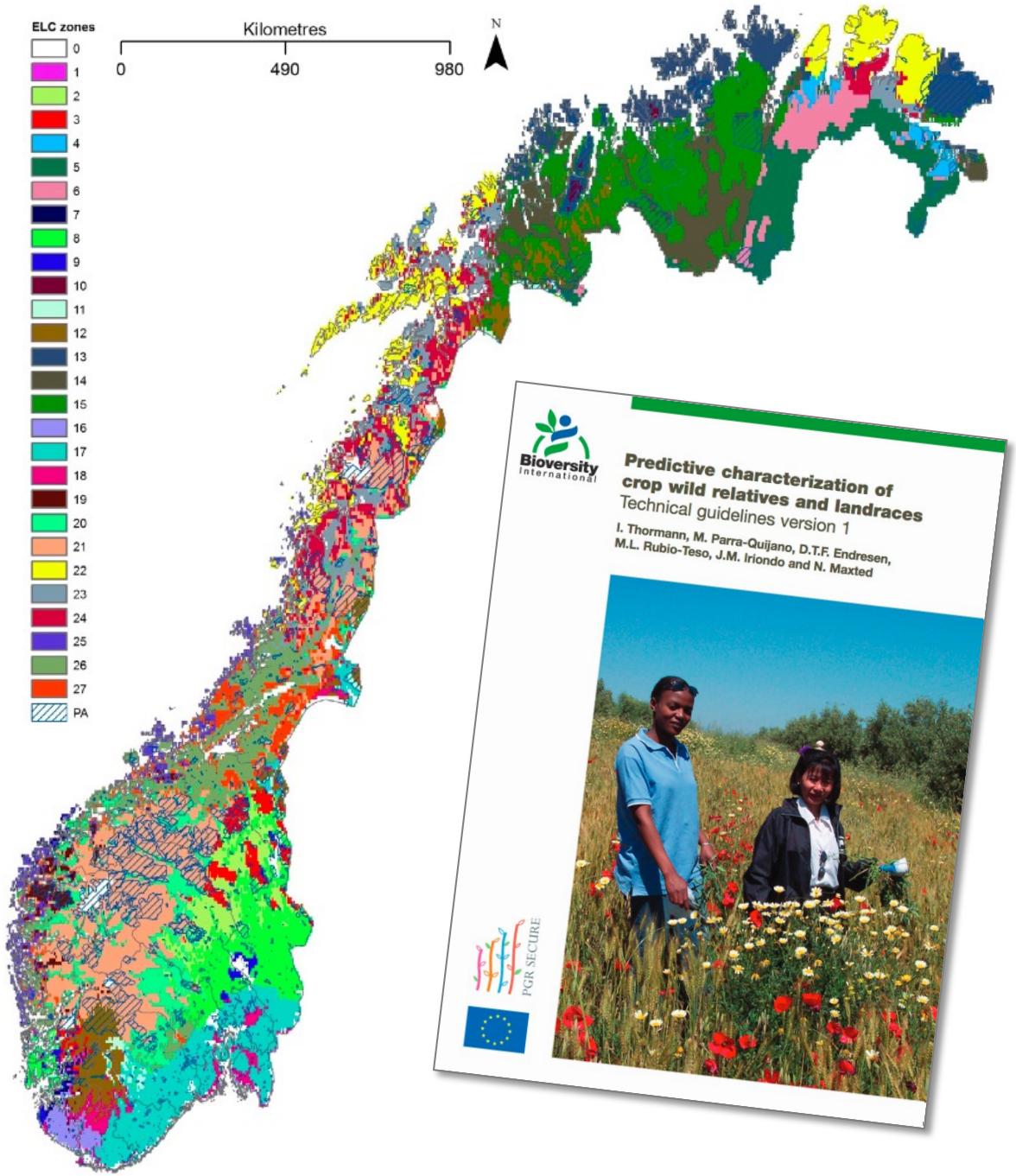


Figure 3 The ELC map for Norway composed of 27 ELC zones each representing a unique combination of environmental variables. See Table S8 for average values in each zone. Zone 0 refers to those areas where information for some of the components making up the map is missing. Variables used to create map: altitude, northness, eastness, slope, precipitation seasonality, isothermality, topsoil organic content and topsoil pH. Created in CAPFITOGEN using the ELC mapas tool. Cell size is equivalent to 10 km^2 at the equator. Map drawn to Geographic Coordinate System: WGS 1984.

ELC maps

Development of a Ecological Land Characterization (ELC) maps using species occurrence data points from GBIF

Thormann, I.; Parra-Quijano, M.; **Endresen, D.T.F.**; Rubio-Teso, M.L.; Iriondo, J.M., & Maxted, N. (2014). Predictive characterization of crop wild relatives and landraces: Technical guidelines version 1. Bioversity International. ISBN 978-92-9255-004-2.

Phillips, J., **Asdal, Å.**, Brehm, J.M., **Rasmussen M.**, & Maxted, N. (2016) *In situ* and *ex situ* diversity analysis of priority crop wild relatives in Norway. Diversity and Distributions, 22, 1112–1126. DOI: 10.1111/ddi.12470

Phillips, J., Magos Brehm, J., van Oort, B. **Asdal, Å.**, **Rasmussen, M.**, & Maxted, N. (2017) Climate change and national crop wild relative conservation planning. Ambio. DOI:10.1007/s13280-017-0905-y

Landraces

Traditionally cultivated, locally adapted, and genetically diverse

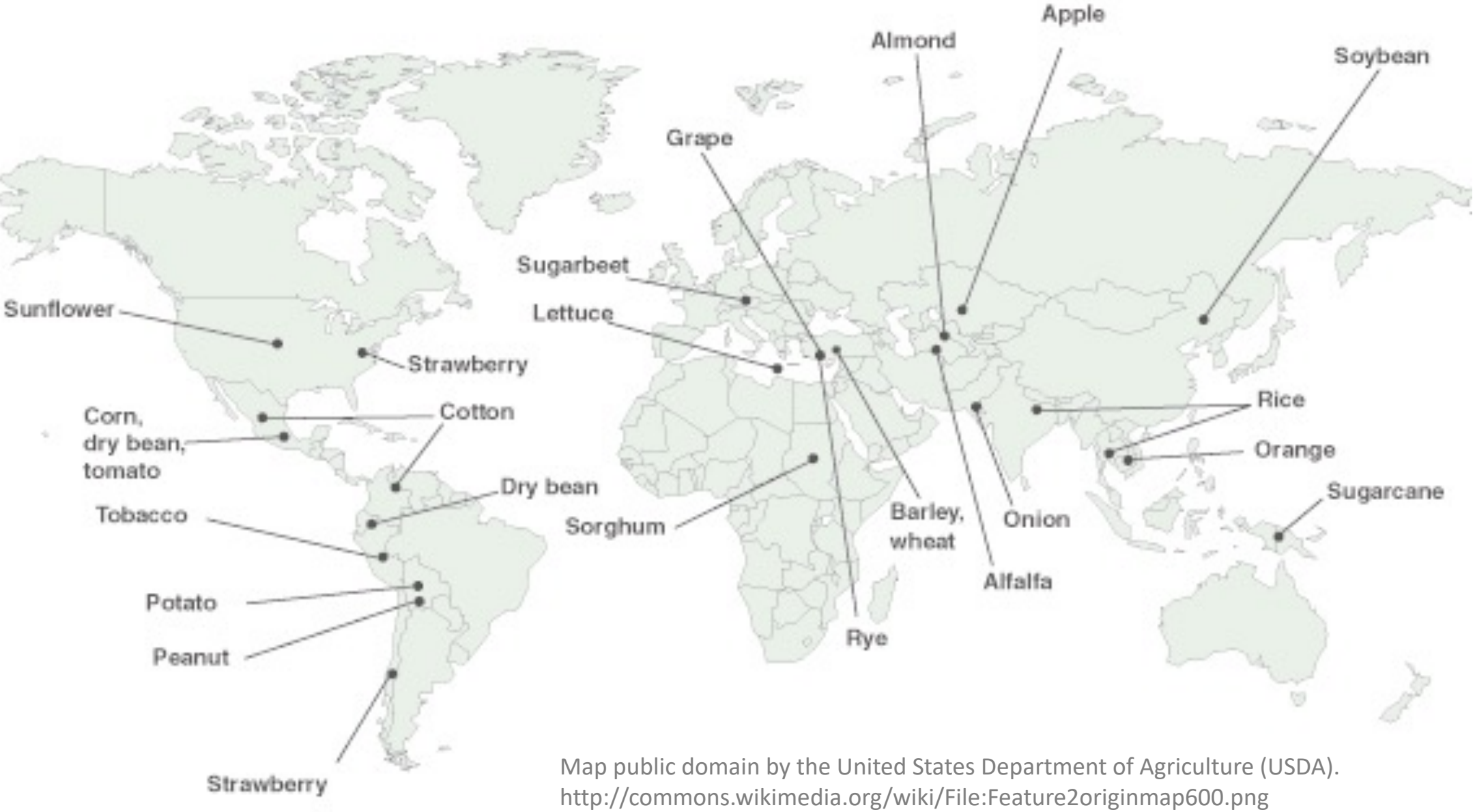
TRADITIONAL CULTIVARS, LANDRACES

"***Landraces*** *have a certain genetic integrity. They are recognizable morphologically; farmers have names for them and different landraces are understood to differ in* ***adaptation*** *to soil type, time of seeding, date of maturity, height, nutritive value, use and other properties. Most important, they are* ***genetically diverse***" (Harlan 1975).

"*A* ***landrace*** *is a dynamic population(s) of a cultivated plant that has a historical origin, distinct identity and lacks formal crop improvement, as well as often being* ***genetically diverse, locally adapted*** *and associated with traditional farming systems*" (Villa *et al*. 2005).

Centers of origin for selected crops

can provide places to search for traditional cultivars & CWRs

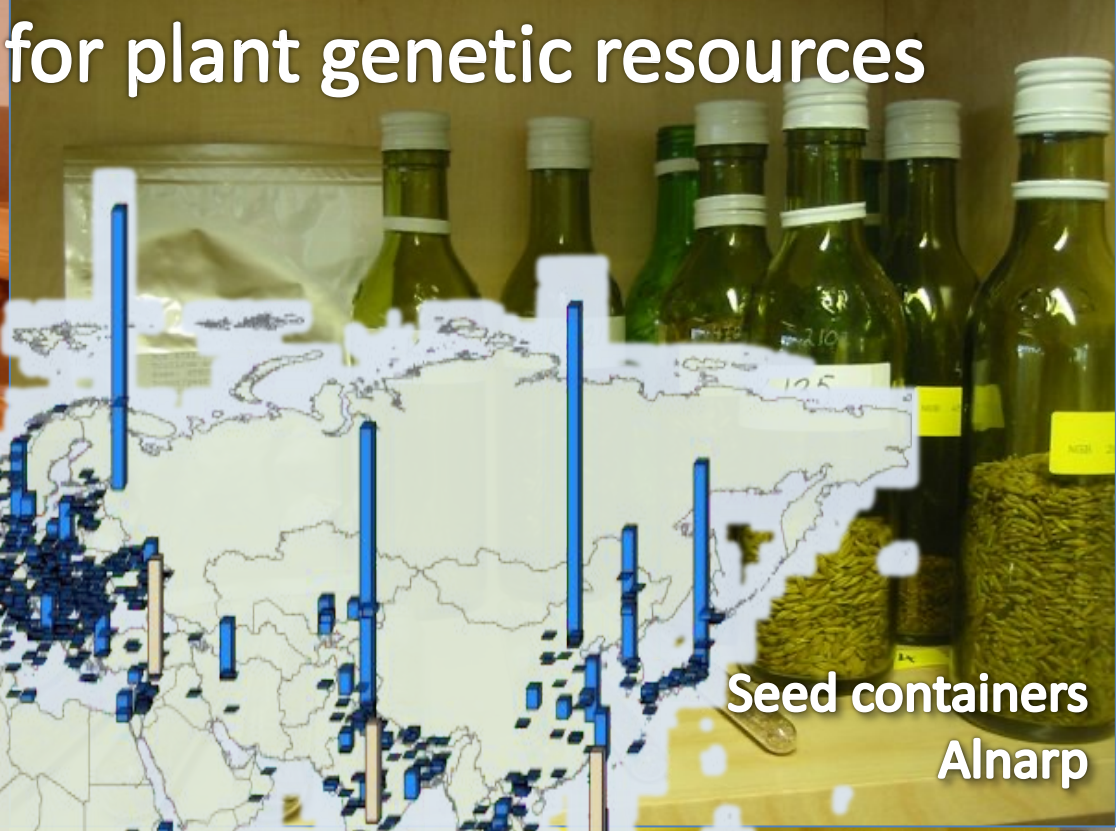


Map public domain by the United States Department of Agriculture (USDA).
http://commons.wikimedia.org/wiki/File:Feature2originmap600.png

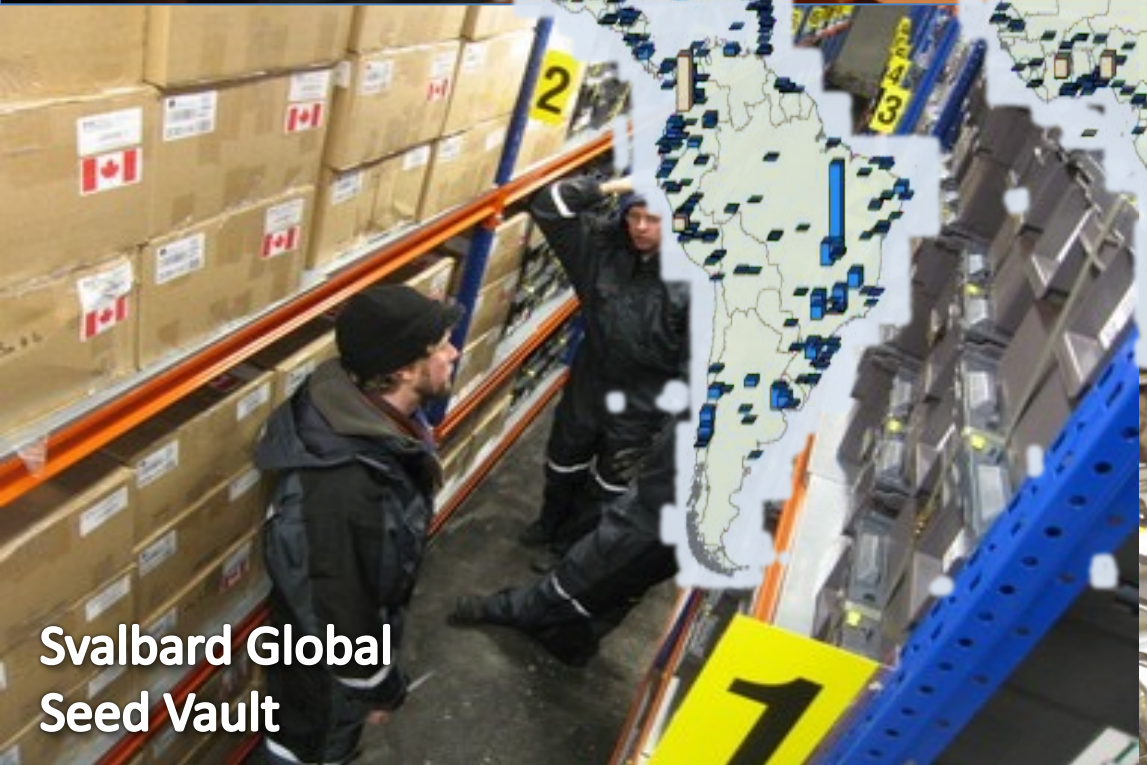
GENETIC RESOURCES, SEEDBANK COLLECTIONS

Ex situ genebank collections for plant genetic resources

Seed drying room, Alnarp



Seed containers Alnarp

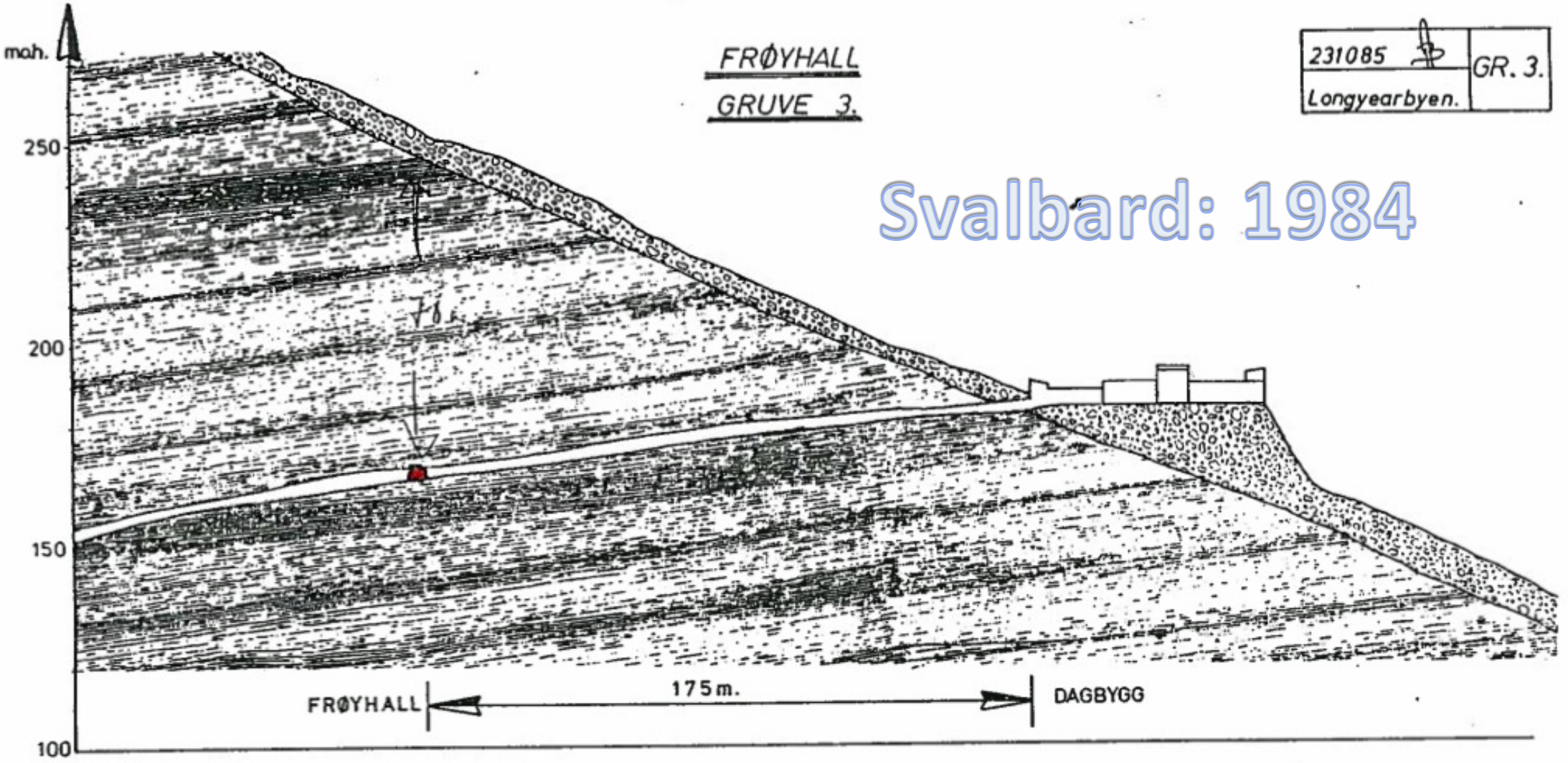


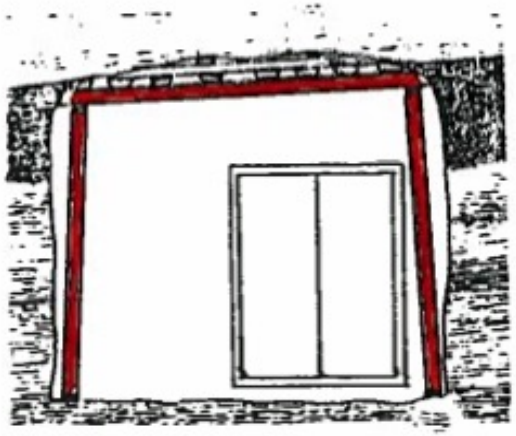
Svalbard Global Seed Vault

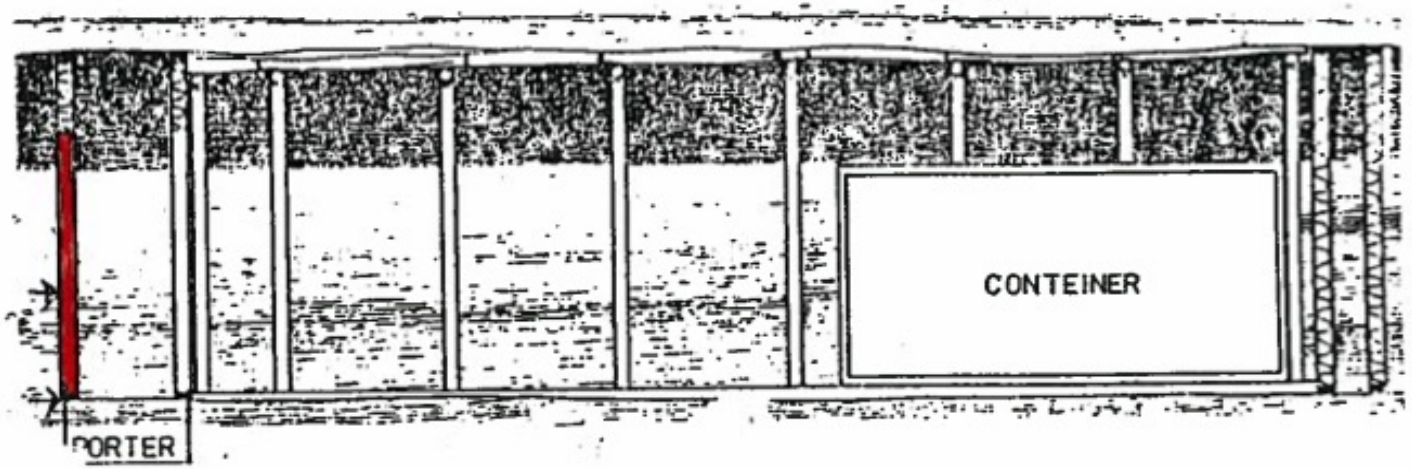
Musa *in vitro* Leuven

FRØYHALL
GRUVE 3.

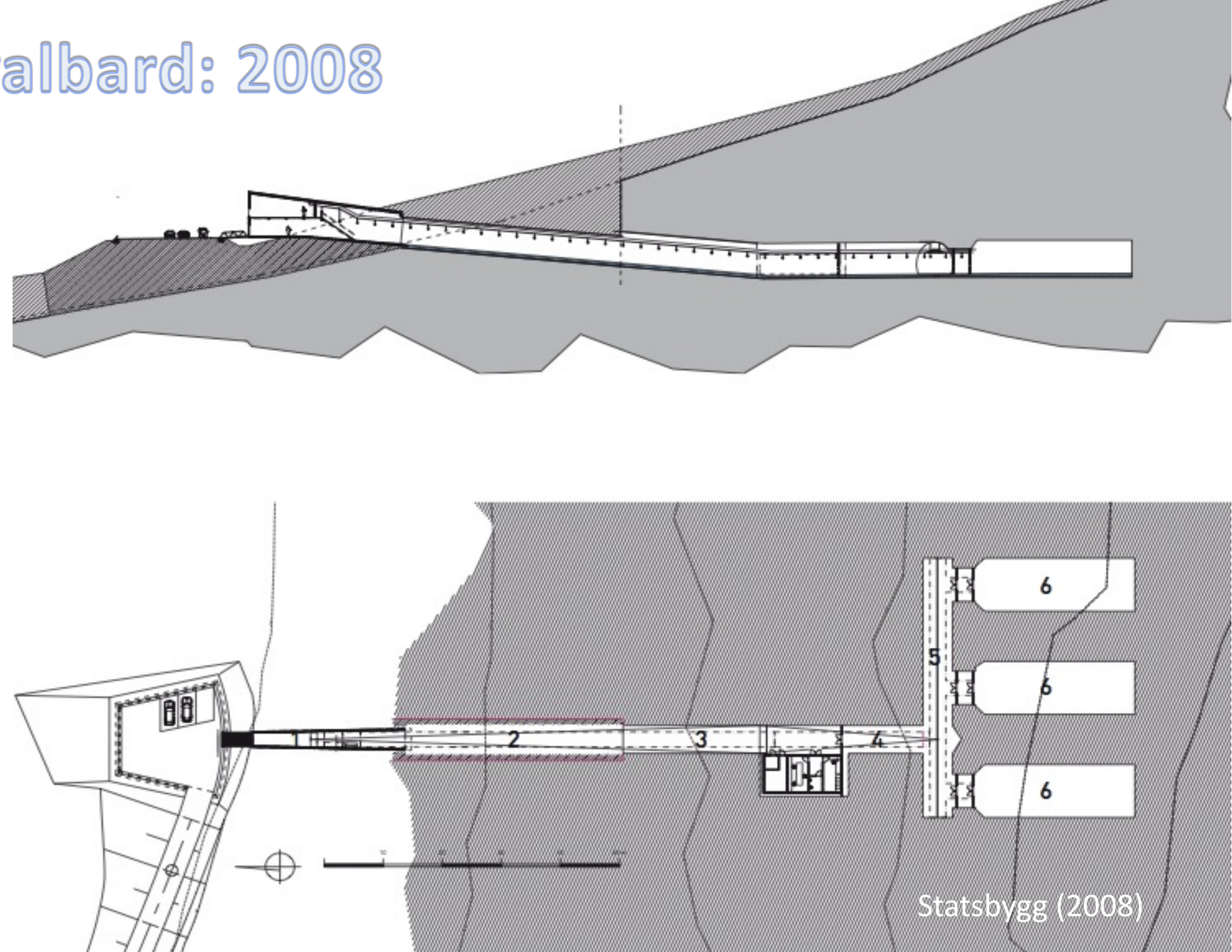
231085	GR. 3.
Longyearbyen.	







Svalbard: 2008



Statsbygg (2008)

Svalbard Global Seed Vault Global Crop Diversity Trust NordGen

Svalbard
Global Seed Vault

Home Depositor Guidelines Information sharing Search!

Information sharing

This page allows you to do basic searches regarding the material to be stored in the Seed Vault.

Search the Seed Portal by:

- Seed samples [643 132] [Download]
- Taxon names [7 033] [Download]
- Species [3 987] [Download]
- Genus [749] [Download]
- Country of origin [227] [Download] [Map]
- Continent of origin [8] [Download] [Map]
- Depositor institutes [34] [Download]
- Depositor and genus [1 430] [Download]
- Depositor, date and crop [2 230] [Download]
- Seed deposit events [70] [Download]

The Svalbard Global Seed Vault (http://www.seedvault.no) provides a safe backup of seeds on food crops conserved by seedbanks worldwide. This picture is from the day after the opening. Photo by Dag Terje Filip Endresen

SGSV metadata by country. The country names are harmonized according to the ISO 3166 standard codes and names.

Search form (sgsv by country)

Country code | equal | DNK | Clear filter | Go!

Add search criteria:

| | contains | | Add

Add columns | Display 25 hits per page. Go!

Total 1 hits or records, record 1 to 1 displayed

D Letterbar

Country name	Country code	Number of accessions	Number of seeds	Taxa x	Genebanks x	Details
Denmark	DNK	2,818	1,382,472	191	13	[Details]

Click the column header to sort the list ↓ click same column head again for reverse order ↑

The Svalbard Global Seed Vault (2008) is operated by NordGen

Data portal online at
http://www.nordgen.org/sgsv

Inside the vault on 27 February 2008, Ola Westengen, Johan Bäckman and Simon Jeppson

Genesys

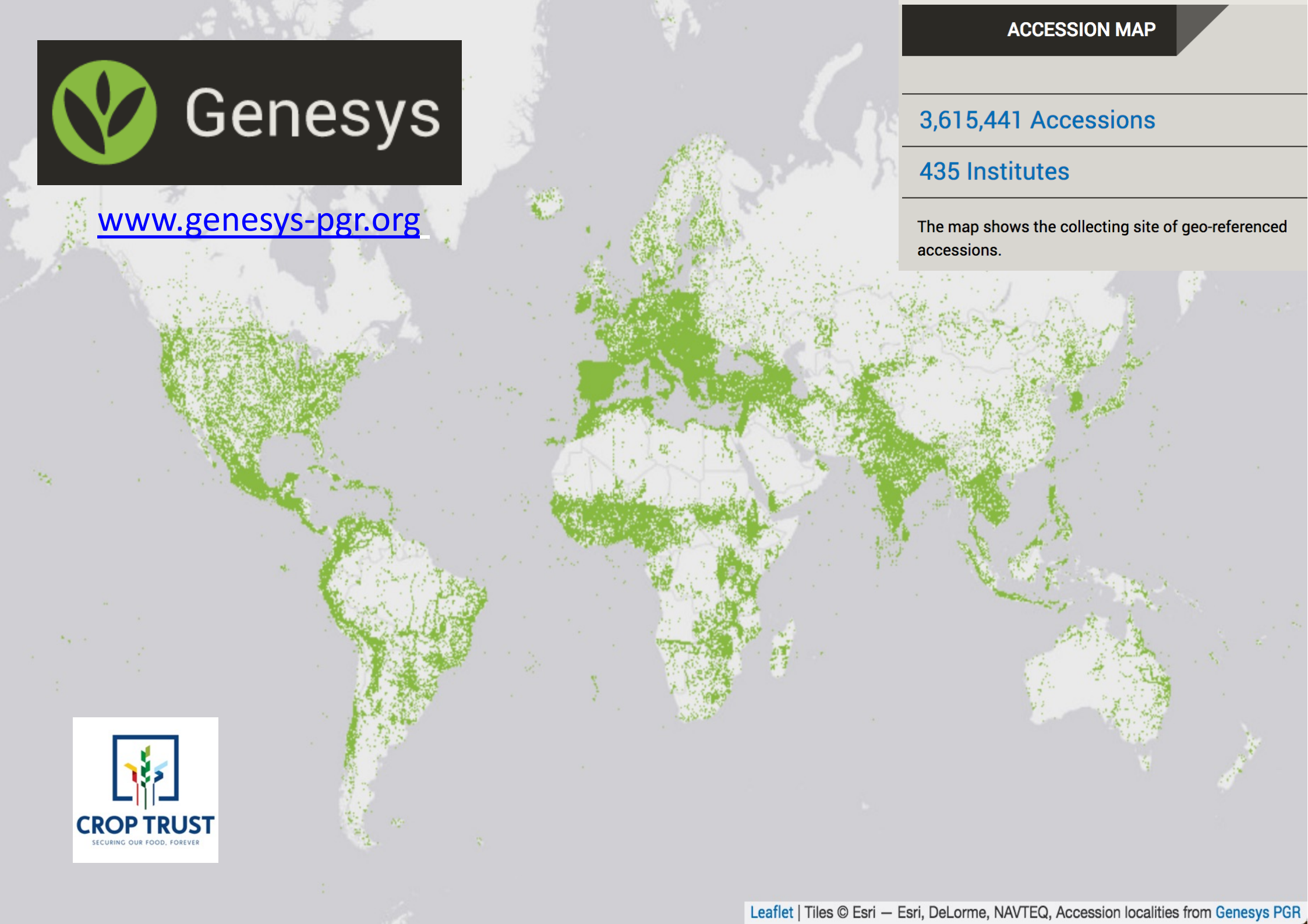
www.genesys-pgr.org

ACCESSION MAP

3,615,441 Accessions

435 Institutes

The map shows the collecting site of geo-referenced accessions.



CROP TRUST
SECURING OUR FOOD, FOREVER

Datasets 1

Search

Publisher

- [x] Bioversity International

Host

Publishing country or area

Project

Licence

SEARCH DATASETS | 4 RESULTS

ALL OCCURRENCE CHECKLIST SAMPLING EVENT METADATA

DOWNLOAD AS TSV

EURISCO, The European Genetic Resources Search Catalogue

Occurrence dataset

The EURISCO web catalogue automatically receives data from the National Inventories (NI). It effectively provides access to all ex situ PGR information in Europe and thus facilitates locating and acce...

Published by Bioversity International

976,457 occurrences 665 citations

The System-wide Information Network for Genetic Resources (SINGER)

Occurrence dataset

The System-wide Information Network for Genetic Resources (SINGER) is an information exchange network of the Future Harvest Centres of the Consultative Group on International Agricultural Research (CG...

Published by Bioversity International

683,018 occurrences 346 citations

SINGER Coordinator

Occurrence dataset

No description available

Published by Bioversity International

270,806 occurrences 328 citations

Bioversity Collecting Mission Database

Occurrence dataset

Access to original passport data of more than 220,000 crop landrace and wild relative samples collected around the world during Bioversity International supported missions. 27% of samples are crop wil...

Published by Bioversity International

158,252 occurrences 344 citations

Get data Share Tools Inside GBIF Login

OCCURRENCE DATASET | REGISTERED 9 JUNE 2017

Bioversity Collecting Mission Database

Published by Bioversity International

Hannes Gaisberger • Dag Endresen • Imke Thormann

DATASET STATS ACTIVITY DOWNLOAD DATASET HOMEPAGE 158,252 OCCURRENCES

Access to original passport data of more than 220,000 crop landrace and wild relative samples collected around the world during Bioversity International supported missions. 27% of samples are crop wild relatives. About 150,000 samples are currently geo-referenced.

See http://bioversity.github.io/geosite/index.html

Bioversity International

Last Modified: 1 November 2017

License: CC BY-NC 4.0

How to cite DOI 10.15468/ulk1iz

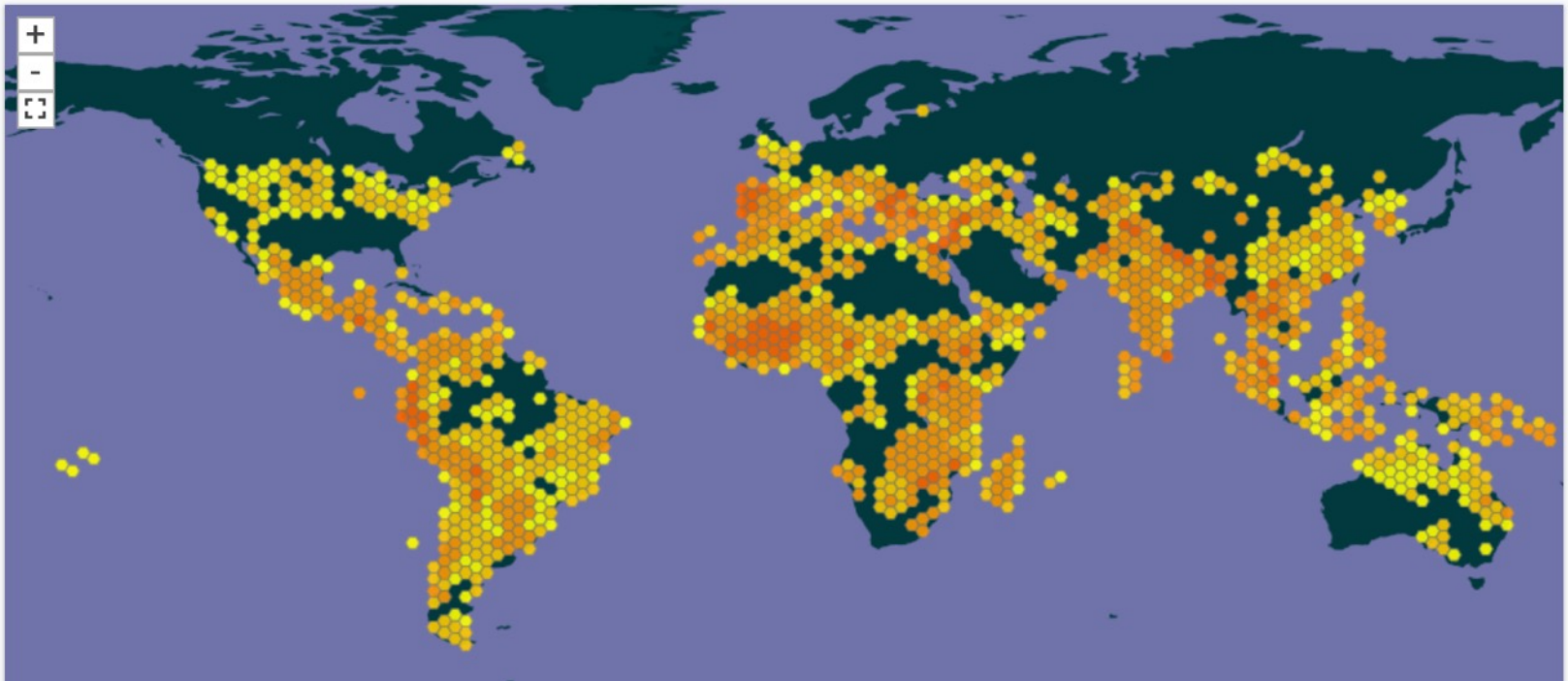
158,252 Occurrences

99% With taxon match

94% With coordinates

91% With year

149,420 GEOREFERENCED RECORDS



Bioversity International

Biodiversity Collecting Mission Database
158 252 occurrences

doi:10.15468/ulk1iz

(Dataset published in GBIF June 2017)

OCCURRENCE DATASET | REGISTERED OCTOBER 9, 2007

EURISCO, The European Genetic Resources Search Catalogue

Published by Bioversity International

DATASET METRICS ACTIVITY DOWNLOAD

976,457 OCCURRENCES 665 CITATIONS

The EURISCO web catalogue automatically receives data from the National Inventories (NI). It effectively provides access to all ex situ PGR information in Europe and thus facilitates locating and accessing PGR.

Metadata last modified: March 9, 2018

Hosted by: Bioversity International

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How to cite DOI 10.15468/a3lnmd

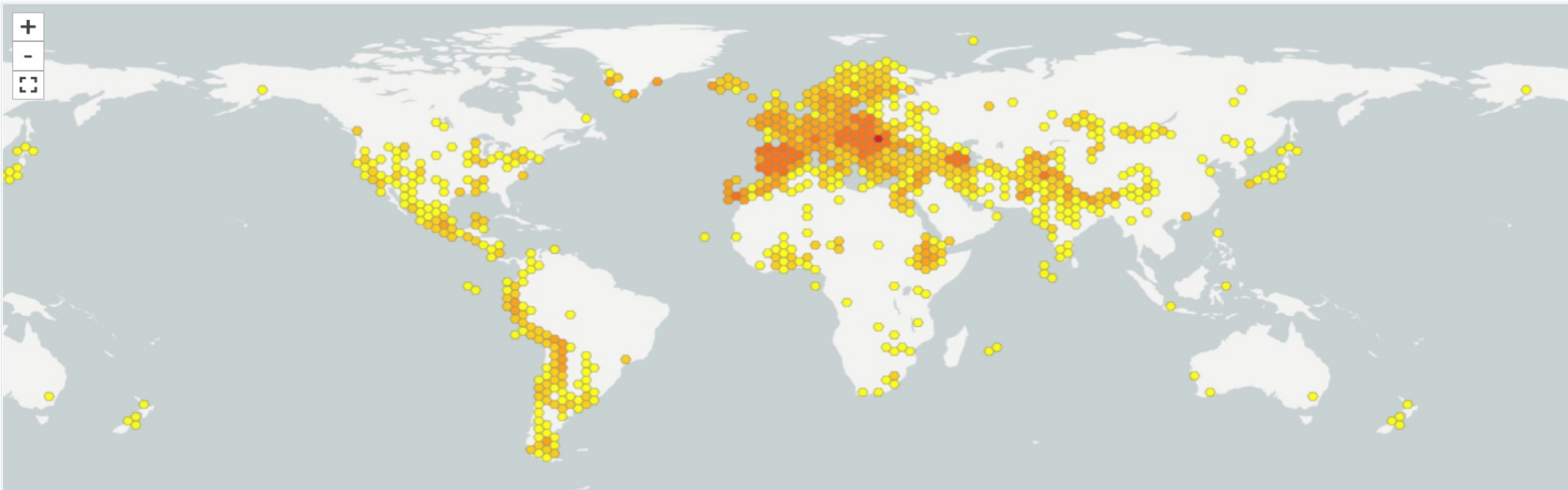
976,457
Occurrences

96%
With taxon match

9%
With coordinates

0%
With year

88,354 GEOREFERENCED RECORDS



PARTICIPANT | ASSOCIATE

Nordic Genetic Resource Center

An associate participant organization from Europe and Central Asia

Member status: Associate

GBIF participant since: 2004

GBIF region: Europe and Central Asia

Head of delegation: Lise Lykke Steffensen

Node name: Nordic Genetic Resource Centre

Node established: 2014

Website: http://www.nordgen.org/index.php/en/content/view/full/2/

Participant node manager: Kjell-Åke Lundblad

ENDORSED PUBLISHERS

N. I. Vavilov Institute of Plant Genetic Resources (VIR)

Joined 11 years ago

3 datasets 187 citations Russian Federation

Nordic Genetic Resource Center (NORDGEN)

Joined 12 years ago
https://www.nordgen.org/en/

2 datasets 242 citations

Genebank collection of Nordic Genetic Resources

Publication date: January 1, 2021

Metadata last modified: October 20, 2021

Hosted by: Nordic Genetic Resource Center (NORDGEN)

Licence: CC BY 4.0

How to cite DOI 10.15468/3nyx9k

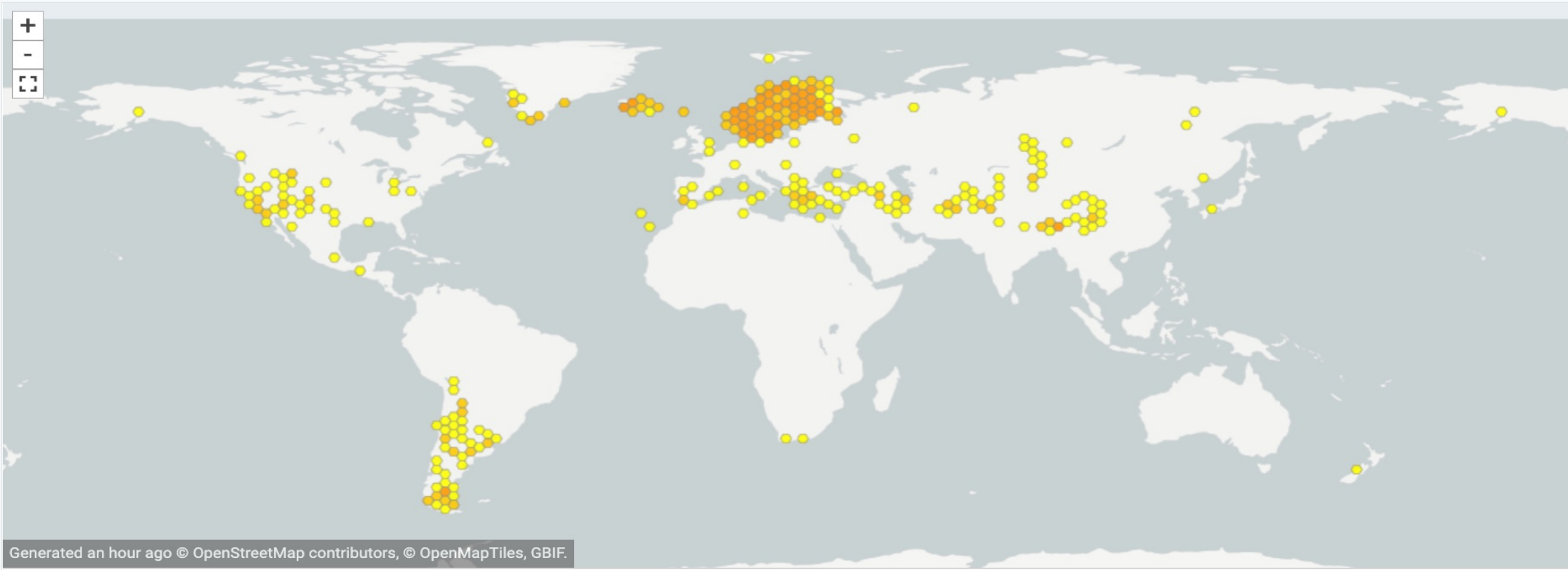
39,623 Occurrences

100% With taxon match

16% With coordinates

17% With year

6,353 GEOREFERENCED RECORDS



Datasets 1

ALL OCCURRENCE CHECKLIST SAMPLING EVENT METADATA

Search

Publisher

N. I. Vavilov Institute of Plant Genetic Resources (VIR)

Host

Publishing country or area

Project

Licence

DOWNLOAD AS TSV

Rye, Barley, Oats Genetic Resources. N.I.Vavilov Research Institute of Plant Industry, St. Petersburg

Occurrence dataset

Rye, Barley, Oats Genetic Resources N.I.Vavilov Research Institute of Plant Industry, St. Petersburg

Published by N. I. Vavilov Institute of Plant Genetic Resources (VIR)

4,129 occurrences 154 citations

Avena wild species collection. (N.I.Vavilov Institute of Plant Genetic Resources (VIR))

Occurrence dataset

Avena wild species VIR collection Rye, Barley, Oats Genetic Resources N.I.Vavilov Institute of Plant Genetic Resources (VIR), St. Petersburg

Published by N. I. Vavilov Institute of Plant Genetic Resources (VIR)

1,639 occurrences 125 citations

Avena wild species VIR Herbarium. N.I.Vavilov Institute of Plant Genetic Resources (VIR)

Occurrence dataset

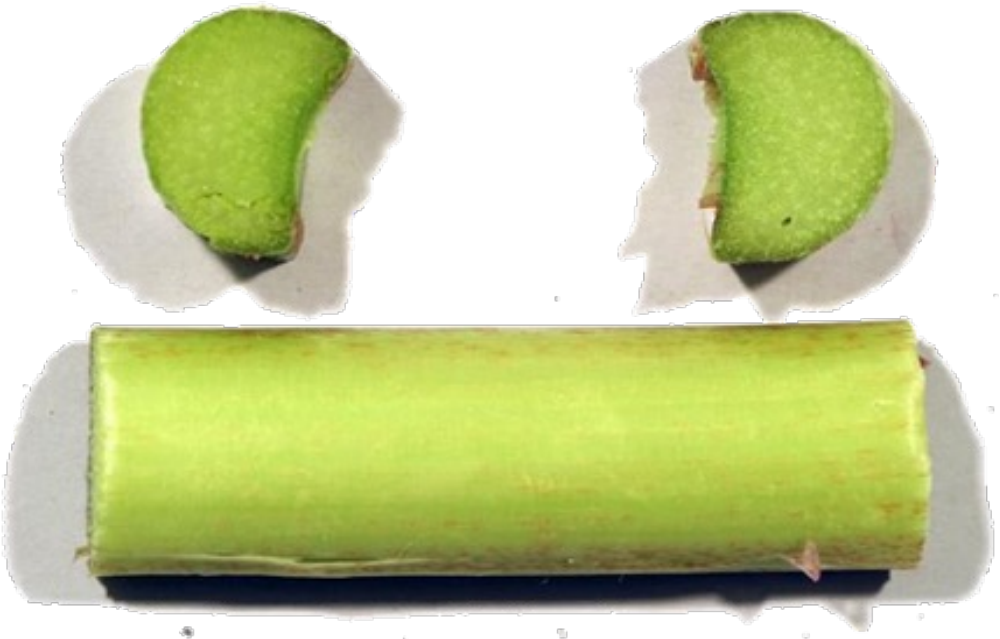
Avena wild species VIR Herbarium Rye, Barley, Oats Genetic Resources. N.I.Vavilov Institute of Plant Genetic Resources (VIR), St. Petersburg

Published by N. I. Vavilov Institute of Plant Genetic Resources (VIR)

311 occurrences 138 citations

Fitness for scientific use of GBIF-mediated data

CROP GENETIC DIVERSITY FOR AGRICULTURAL TRAITS



Rhubarb, *Rheum x hybridum* Murray, DKRHE43, by Gitte K. Bjørn

Field trials in Horsham Australia for cold tolerance in chickpea (*Cicer arietinum* L.). CC-by D. Endresen

Powdery Mildew,
Blumeria graminis

Leaf spots
Ascochyta sp.

Yellow rust
Puccinia strilformis

Black stem rust
Puccinia graminis

Apple, *Malus domestica* Borkh.
Cultivar "*Nanna*" by Stein H Hjeltnes

MCPD -> ABCD 2.06 (2004)

National Inventory Code
Institute Code
Accession Number
Collecting Number
Collecting Institute Code
Genus
Species
Species Authority
„Subtaxa“
„Subtaxa“ Authority
Common Crop Name
Accession Name
Acquisition Date

Country of Origin
Location of Collection Site
Latitude of CS
Longitude of CS
Elevation of CS
Collecting Date of Sample
Breeding Institute Code
Biological Status of Accession
Ancestral Data
Collecting/Acquisition Source

Donor Institute Code
Donor Accession Number
Other Identification (Number) associated with the accession
Location of Safety Duplicates
Type of Germplasm Storage
Remarks
Decoded Collecting Institute
Decoded Breeding Institute
Decoded Donor Institute
Decoded Safety Duplication Location
Accession URL

Helmut Knüpffer
IPK Gatersleben

Walter Berendsohn
BGBM

Descriptors marked red did not match the earlier versions of ABCD
→ ABCD was extended by a PGR section [W. Berendsohn, H. Knüpffer]

http://www.ecpgr.cgiar.org/epgris/Tech_papers/EURISCO_Descriptors.pdf

European Cooperative Programme for Plant Genetic Resources

ECP/GR

European Cooperative Programme for Plant Genetic Resources

EPGRIS

EPGRIS3 Meeting 'Inclusion of C&E data in EURISCO' May 2009

EUROPEAN MEETING ON C&E ("MOF")

Aim to publish trait data (characterization and evaluation, C&E) from online crop portals.

European genebank meeting in Bonn May 2009 (ECPGR ICT Group).

Developed guidelines & data exchange models.

Some harmonization with Darwin Core and DwC Measurement or Fact (MoF).

→ DwC germplasm extension, released 2012.

→ GBIF data fitness for use in agrobiodiversity, 2016.

→ EURISCO C&E data models, implemented 2017.

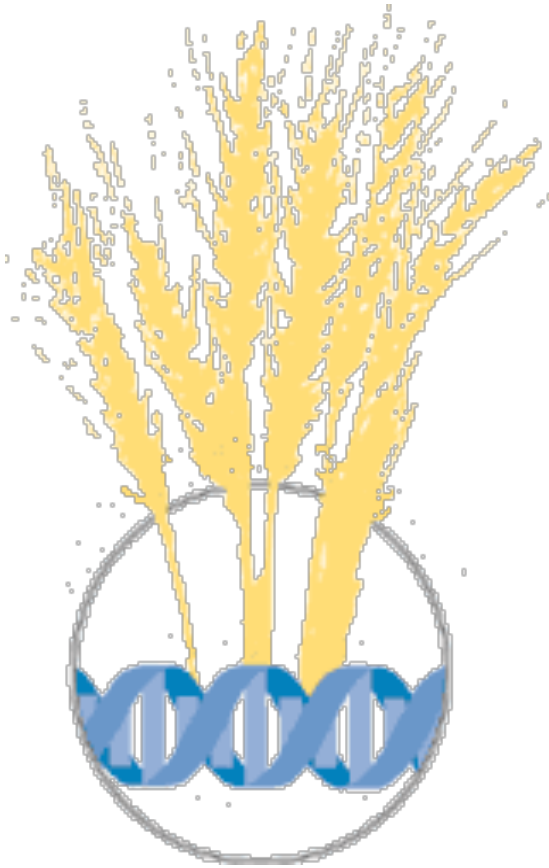
Biodiversity Informatics, 8, 2012, pp. 12-29

THE DARWIN CORE EXTENSION FOR GENEBANKS OPENS UP NEW OPPORTUNITIES FOR SHARING GERMPLASM DATA SETS

DAG T.F. ENDRESEN*
Global Biodiversity Information Facility (GBIF), Copenhagen, Denmark

AND

HELMUT KNÜPFFER
Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany



Abstract. – Darwin Core (DwC) defines a standard set of terms to describe the primary biodiversity data. Primary biodiversity data are data records derived from direct observation of species occurrences in nature or describing specimens in biological collections. The Darwin Core terms can be seen as an extension to the standard Dublin Core metadata terms. The new Darwin Core extension for genebanks declares the additional terms required for describing genebank data sets, and is based on established standards from the plant genetic resources community. The Global Biodiversity Information Facility (GBIF) provides an information infrastructure for biodiversity data including a suite of software tools for data publishing, distributed data access, and the capture of biodiversity data. The Darwin Core extension for genebanks is a key component that provides access for the genebanks and the plant genetic resources community to the GBIF informatics infrastructure including the new toolkits for data exchange. This paper provides one of the first examples and guidelines for how to create extensions to the Darwin Core standard.

Keywords. – Darwin Core; Darwin Core extension; GBIF; genebank collections; germplasm; plant genetic resources.

Endresen, D.T.F. and H. Knüpffer (2012). The Darwin Core extension for genebanks opens up new opportunities for sharing genebank data sets. Biodiversity Informatics 8:11-29. DOI: https://doi.org/10.17161/bi.v8i1.4095

WHY DID WE MAKE A DARWIN CORE EXTENSION FOR GERMPLASM DATA?

→ Upgrade germplasm data pathways to use web services

The objective (1) was to enable sharing of germplasm information using the standard web-service based biodiversity data publishing toolkits maintained by the Global Biodiversity Information Facility (GBIF) and the Biodiversity Information Standards (TDWG).

→ Upgrade data types to include trait data

The objective (2) was to expand on the germplasm data types published to germplasm data portal from basic passport data to include in particular crop trait information.

Event core for measurement or fact data

Belspo, Brussel, January 2018

Image CC-BY Dag Endresen

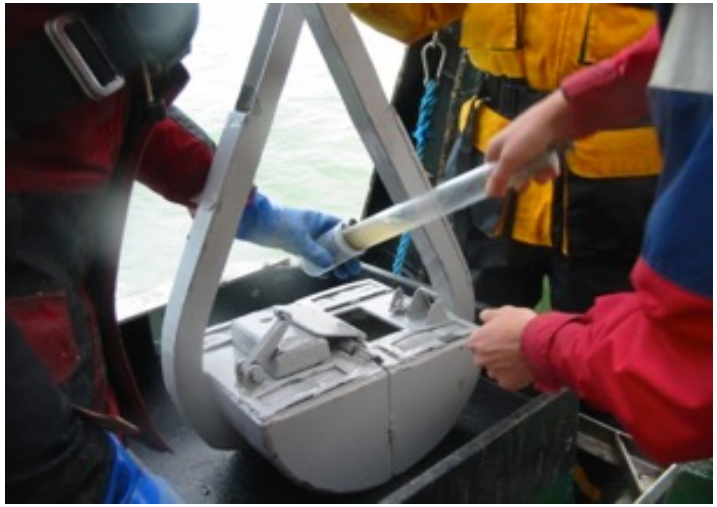
DWC EVENT CORE + EMOF

DwC Event Core + eMoF, as proposed by iOBIS, opens up promising possibilities for publishing also crop trait /C&E) data!!

- Using the GBIF infrastructure for data exchange.
- With collaboration on data exchange schema between thematic domains (terrestrial crops, marine, etc).

SAMPLING MORE DATA THAN JUST SPECIES OCCURRENCE

Water sample from a Niskin bottle



Core sample from a Van Veen grab

plankton net with CTD

Video plankton recorder

IODE

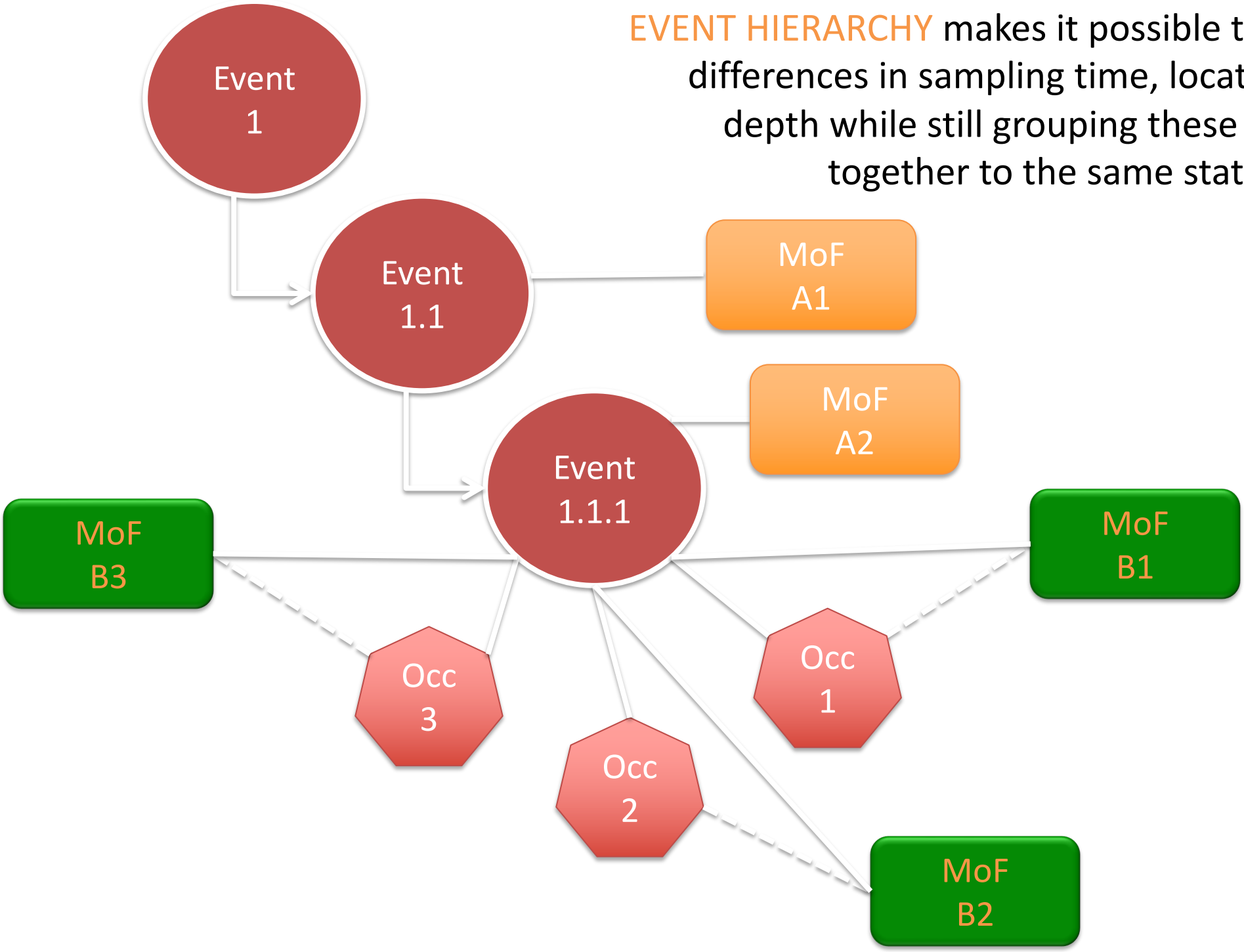
OTN tags

Use case : Measurements for both events and occurrences in the same dataset

OBIS expeditions are sampling more data than only organism occurrences.

--> development of a new extended measurement and fact extension (for DwC-archives)

EVENT HIERARCHY makes it possible to record differences in sampling time, location, and depth while still grouping these samples together to the same station visit.



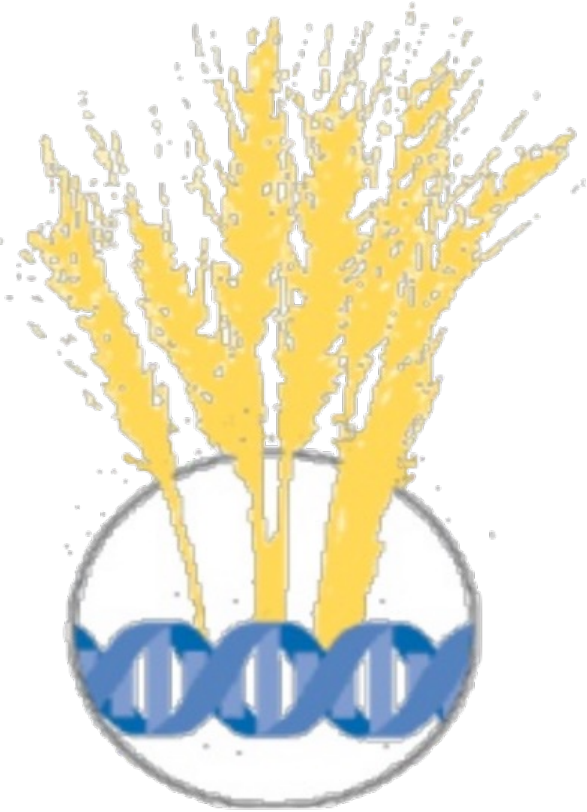
Slides by:
OBIS-ENV-DATA

OBIS
OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM

Proposing a new use case:

Measurement events as dwc:Event

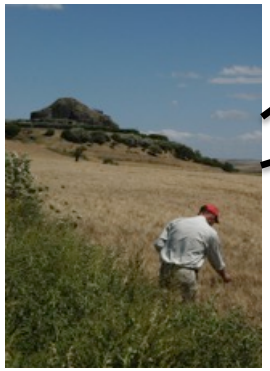
Experiments with living specimens at a location and date that is different from the **collecting event**.



Collecting expeditions

Genebank, collections

Field/lab experiments



Seeds from collecting trip expeditions are deposited in genebank collections.

Living seeds from genebank collections are used for field or laboratory experiments.

GERMPLASM MATERIAL FLOW

Material samples from many different collecting missions are deposited in different genebanks.

Material from public genebanks are included in other genebank collections (and breeders collections).

Material from different genebanks (and thus many different collecting events) are included in each field trial experiment.

Collecting Event ≠ Measurement Event (MoF)

Fitness for scientific use of GBIF-mediated data

Final Report of the Task Group on GBIF Data Fitness for Use in Agrobiodiversity

Final version 1.0 published on 15 February 2016

Authors (in alphabetical order)

Elizabeth Arnaud, Bioversity International, France - Task Group Chair
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GBIF and Bioversity (2016) Final report of the task group on GBIF data fitness for use in agrobiodiversity. Global Biodiversity Information Facility, Copenhagen. http://www.gbif.org/resource/82283

FAO/Bioversity Multi-Crop Passport Descriptors V.2.1 [MCPD V.2.1]

The MCPD, developed jointly by Bioversity International (formerly IPGRI) and FAO, is a widely used international standard to facilitate germplasm passport information exchange. These descriptors are compatible with Bioversity's crop descriptor lists, with the descriptors used by the FAO World Information and Early Warning System (WIEWS) on plant genetic resources (PGR), and with the GENESYS global portal. This list of Multi-crop Passport Descriptors (MCPD V.2.1) is an update to MCPD V.2 which was released in 2012.

the first FAO/IPGRI publication released in 2001

Topic(s)	Sustaining local crop diversity
Subject area(s)	Promoting local crop diversity
Subject category(ies)	Improving the knowledge base for local crop diversity
Publisher	Bioversity International, Food and Agriculture Organization of the United Nations (FAO)
Publication date	2015


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Martin Weih
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Peter Csoka
Secretary a.i.
International Poplar Commission
Eva Muller
Director
Forestry Policy and Resources
Division, FAO

Data required for the assignation of Digital Object Identifiers in the Global Information System

Latest version:

Data required for the assignation of Digital Object Identifiers in the Global Information System - v.2.1 (http://www.fao.org/3/a-bt113e.pdf)

Also available in French, Spanish and Arabic

20 July 2017

Outdated versions:

- Data required for the assignation of Digital Object Identifiers in the Global Information System - v.2 (http://www.fao.org/

Also available in Spanish, French and Arabic

- Data required for the assignation of Digital Object Identifiers in the Global Information System - v.1 (http://www.fao.org/3/a-

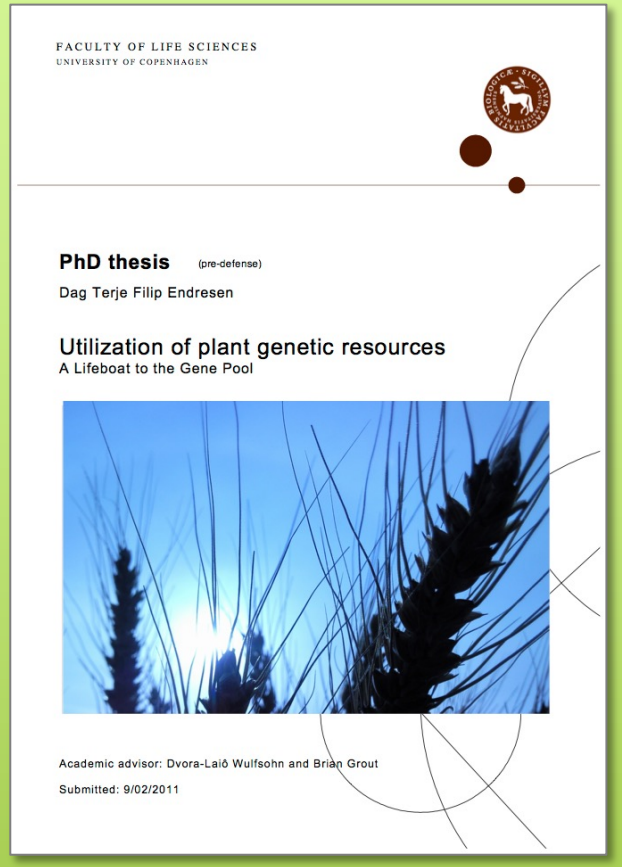
Documentation of crop wild relatives

The International Treaty released in 2021 an updated list of passport descriptors for crop wild relatives conserved *in situ*. This publication provides an international standard to ensure consistency in the way data about plant genetic material of crop wild relatives (CWR) are documented and exchanged around the world.

This booklet is available in English, Arabic, French and Spanish, and is expected to be particularly helpful for researchers, plant breeders, and conservationists worldwide, in addition to national focal points of the International Treaty.

Starting date: 1 June 2019	**Ending date: 30 June 2023**
Donor: Government of Germany – BMEL	**FAO project code:** GCP /GLO/974/GER

Predictive characterization




Searching for traits of resistance to crop diseases and pests in wheat and barley landraces

FACULTY OF LIFE SCIENCES
UNIVERSITY OF COPENHAGEN

PhD thesis (pre-defense)

Dag Terje Filip Endresen

Utilization of plant genetic resources
A Lifeboat to the Gene Pool

Academic advisor: Dvora-Laiô Wulfsohn and Brian Grout

Submitted: 9/02/2011

PHD THESIS 2011

A LIFEBOAT TO THE GENE POOL

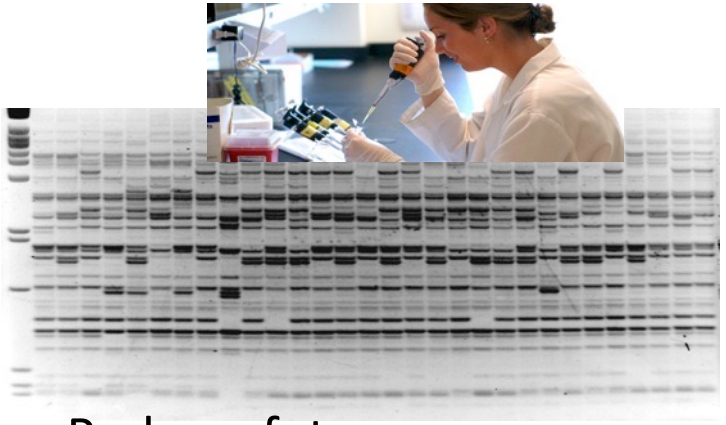
CLIMATE EFFECT DURING THE DOMESTICATION PROCESS

Wild relatives are shaped by the environment.

Primitive cultivated crops are shaped by local climate and humans.

Traditional cultivated crops (landraces) are shaped by climate and humans.

Modern cultivated crops are mostly shaped by humans (plant breeders).



Perhaps future crops are shaped in the molecular laboratory…?

PREDICTIVE LINK BETWEEN ECO-GEOGRAPHY AND TRAITS

During traditional cultivation the farmer will select for and introduce germplasm for improved suitability of the landrace to the local conditions.

SELECTED STUDIES

Heuristic approach:

- Sunn pest on wheat (Bouhssini *et al*. 2009)
- Powdery mildew, *Pm3* (Bhullar *et al*. 2009)
- Russian wheat aphid (Bouhssini *et al*. 2011)

Multi-way approach:

- Morphological traits Nordic Barley landraces (Endresen 2010)

Multivariate approach:

- Net blotch on barley landraces (Endresen *et al*. 2011)
- Stem rust on wheat landraces (Endresen *et al*. 2011)
- Stem rust on wheat landraces (Bari *et al*. 2012)
- Ug99 stem rust on wheat (Endresen *et al*. 2012)
- Faba bean drought tolerance (Khazaei *et al*. 2013a, 2013b)
- Stripe (yellow) rust on wheat (Bari *et al*. 2014)
- Faba bean drought adaptation (Bari *et al*. 2016)

Crop wild relatives:

- Technical guidelines (Thormann *et al*. 2014)
- Avena CWR (Thormann *et al*. 2015)

Salix Accessions at Alnarp, 2011 by Dag Endresen, CC-By

Try yourself!

Documented R-scripts, test data, and step-wise instructions.

Thormann I, Parra-Quijano M, Endresen DTF, Rubio-Teso ML, Iriondo JM & Maxted N. (2014) Predictive characterization of crop wild relatives and landraces: Technical guidelines version 1.Bioversity International, Rome, Italy. 44 pp. ISBN: 978-92-9255-004-2.

doi:10.13140/RG.2.1.1359.0487
https://www.duo.uio.no/handle/10852/41681

GBIF.no

GBIF fitness for use in Agrobiodiversity

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