GBIF Global Nodes Meeting 2017

Nordic Crop Wild Relative conservation strategies

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Helsinki, Finland, September 25th 2017

NORDIC CROP WILD RELATIVES

Nordisk Ministerråd

EU project "*PGR Secure*" (2011-2014)

NMR funded project "*Ecosystem services: Genetic resources and crop wild relatives*" (2015-2016)

NMR funded project "*Wild genetic resources – a tool to meet climate change*" (2017-2018)

NordGen

LUOMUS
FINNISH MUSEUM OF NATURAL HISTORY

Luke
NATURAL RESOURCES INSTITUTE FINLAND

LINKÖPINGS UNIVERSITET

Jordbruks verket
Swedish Board of Agriculture

NIBIO
NORSK INSTITUTT FOR BIOØKONOMI

Ministry of Environment and Food of Denmark
The Danish Agrifish Agency

Grasagarður Reykjavíkur
Reykjavik Botanic Garden

GBIF Norway

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

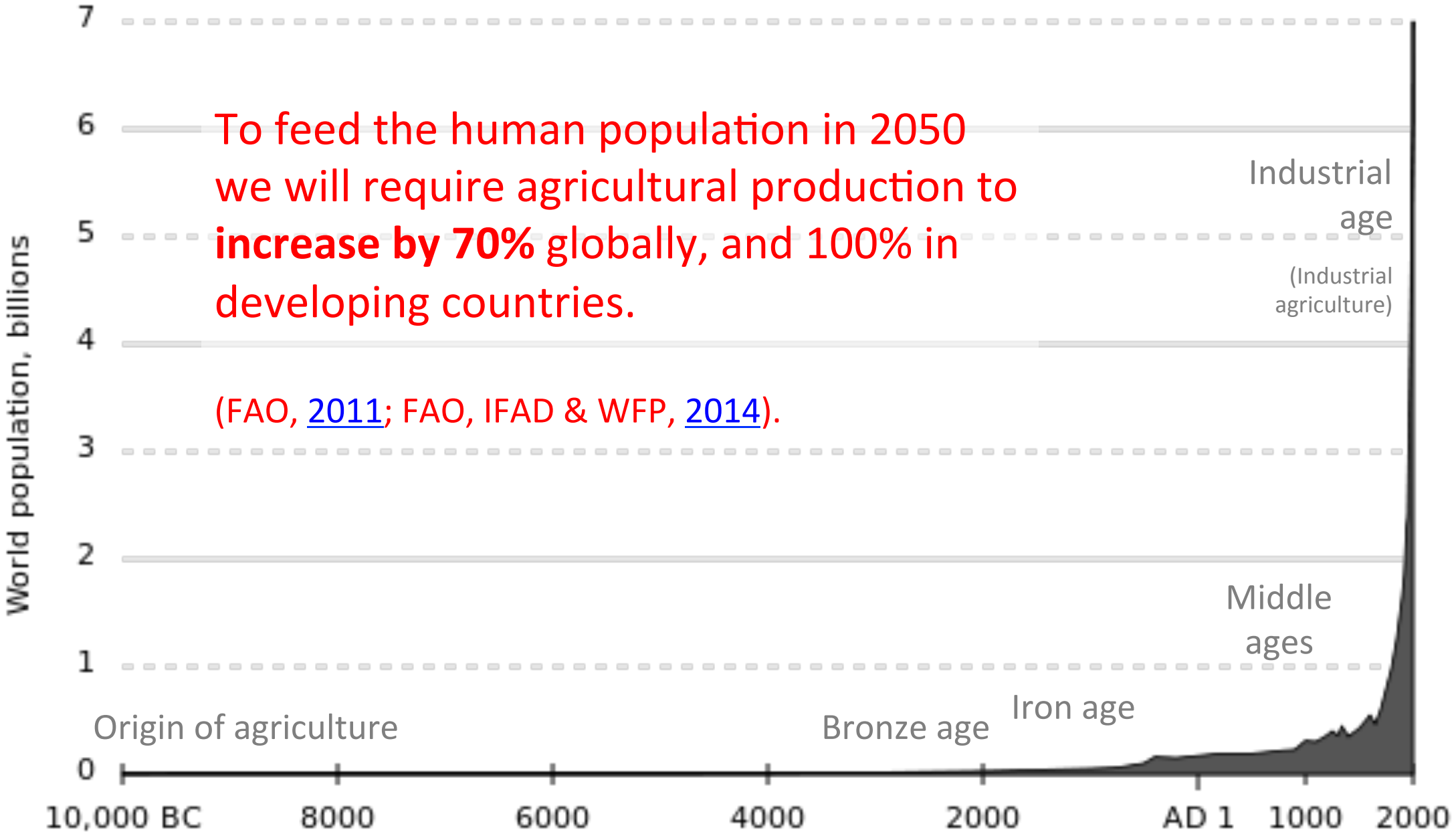
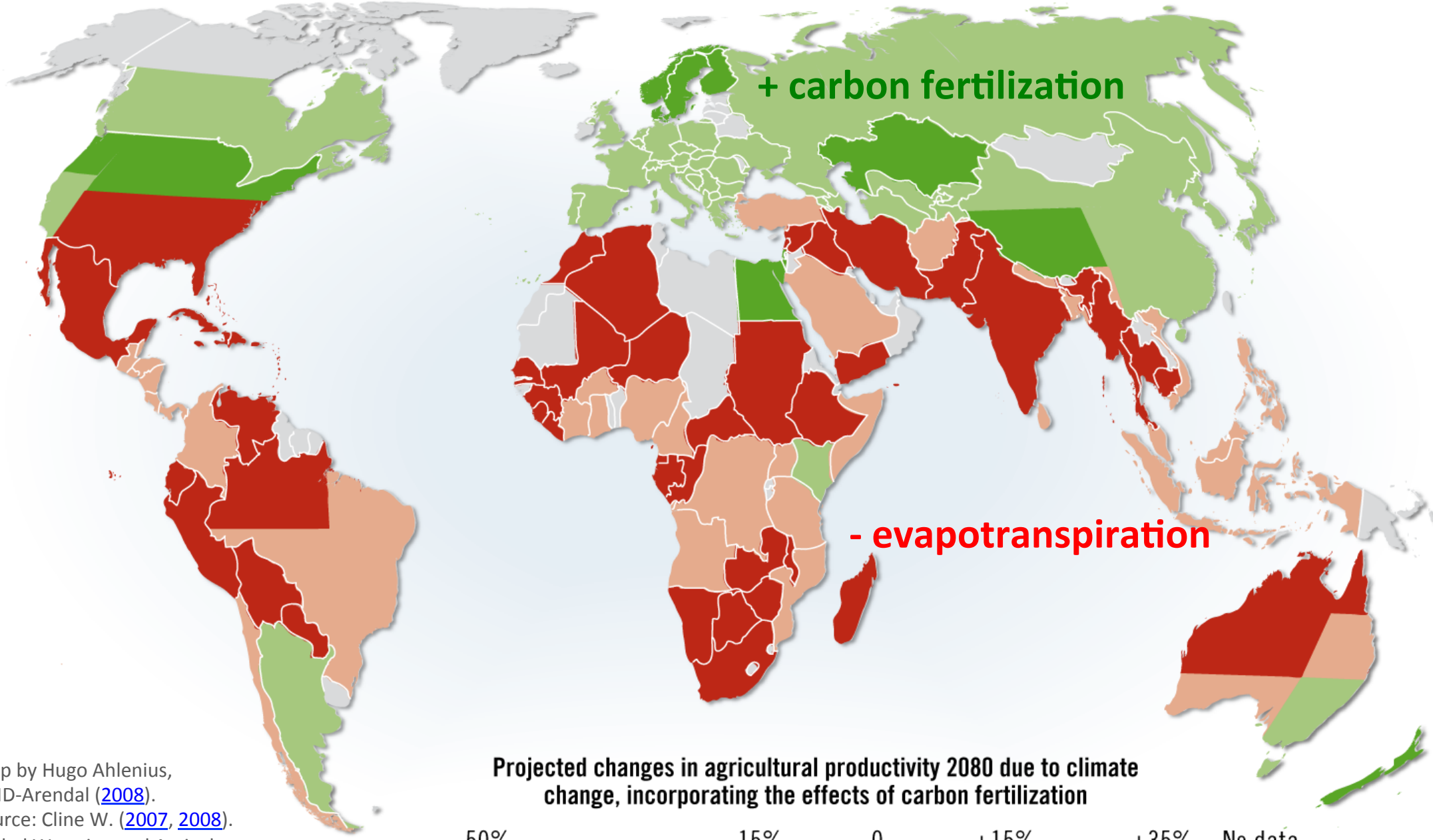


Illustration: Wiki Commons Public Domain.

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

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.

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

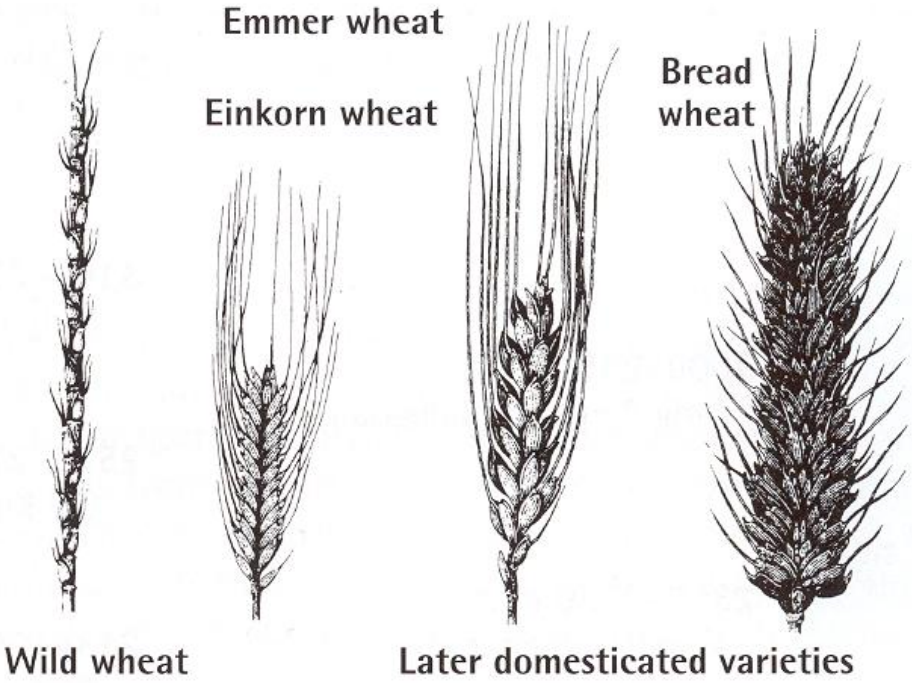
WE NEED CROPS:

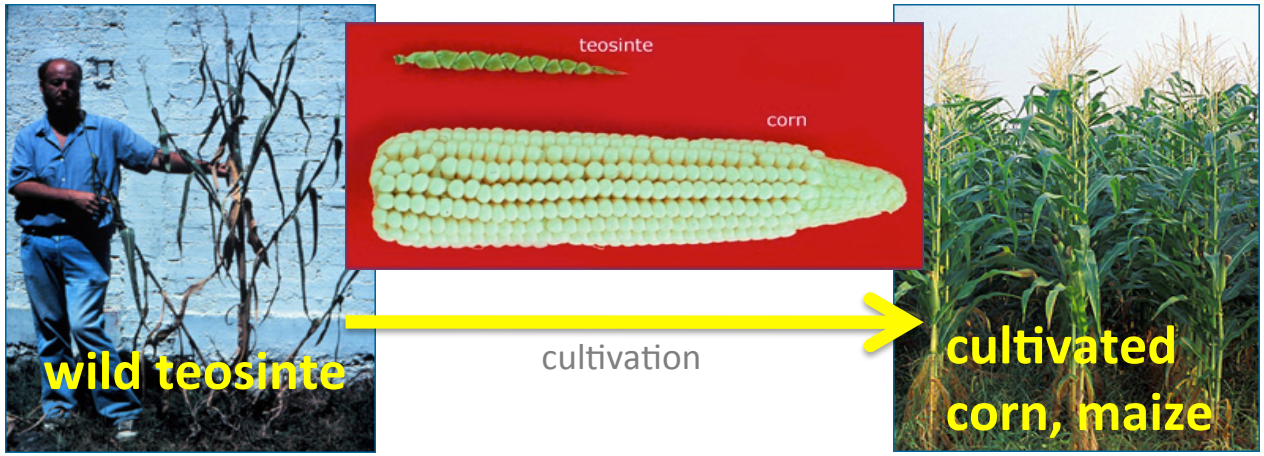
- with higher yields
- with higher nutritional value
- adapted to degraded lands
- adapted to changing environments

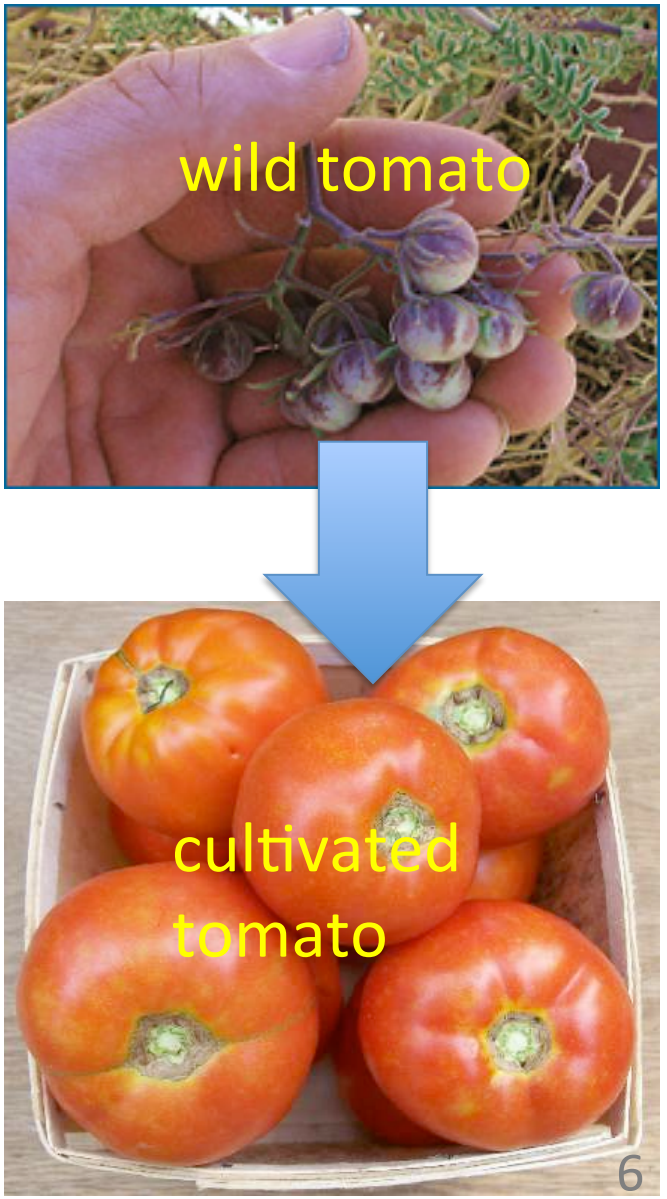
Untapped genetic diversity can be found in:

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.

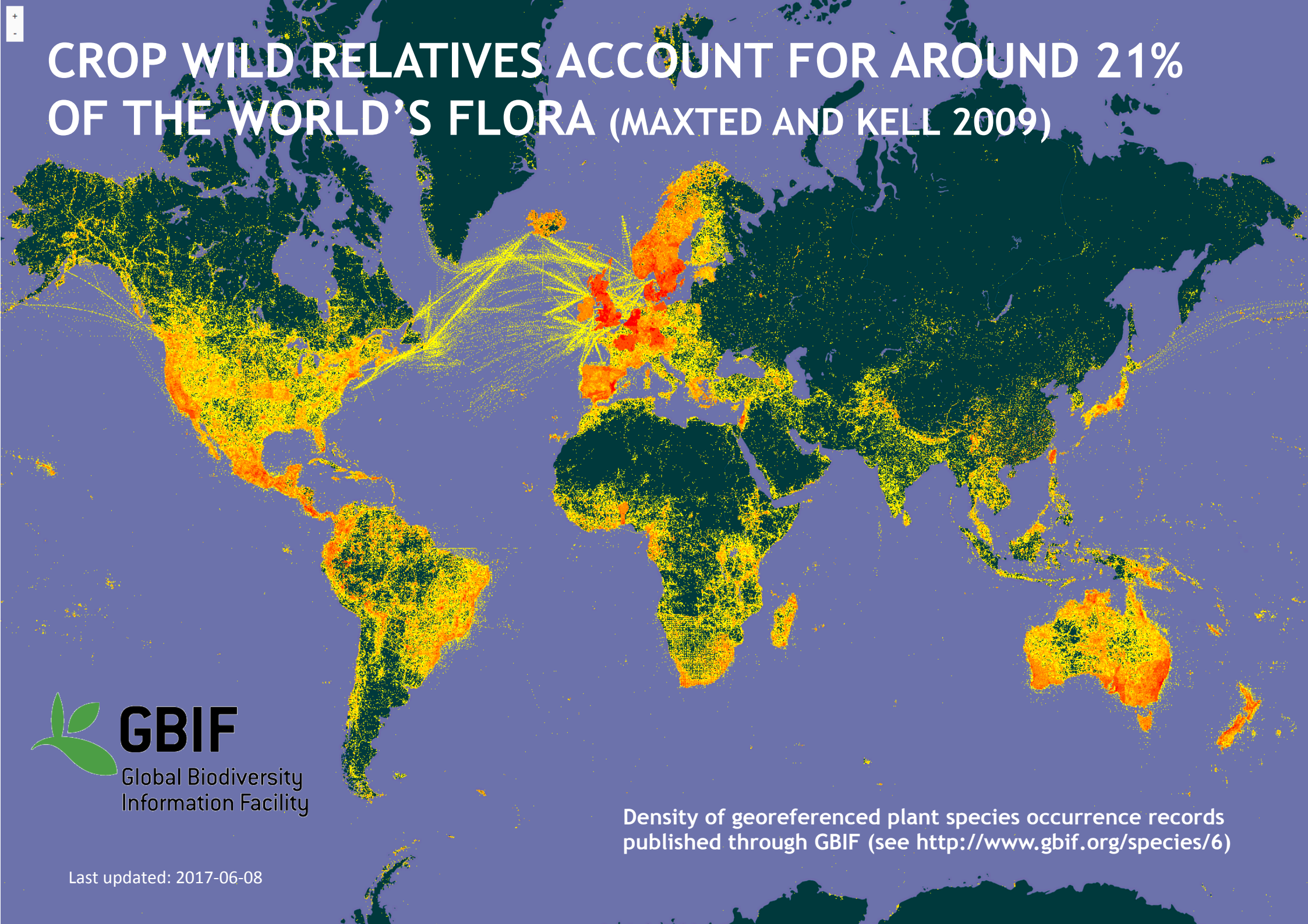
They are an important socio-economic resource that **offer novel genetic diversity** required to maintain future food security.

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

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)



Nordisk Ministerråd

Nordic crop wild relative conservation strategies

Plant in focus: Prickly lettuce

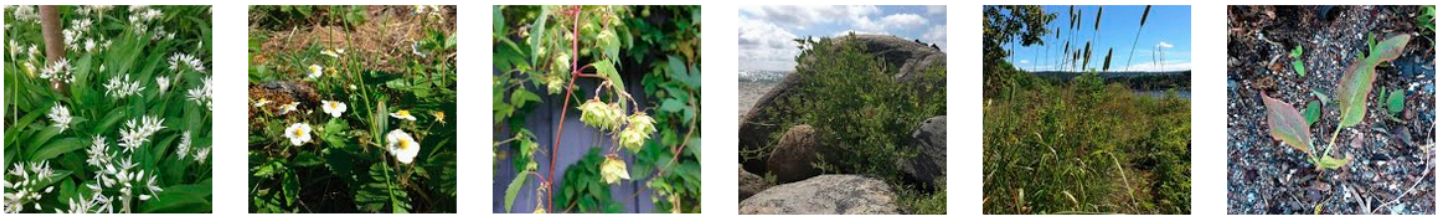
The wild flora holds a number of plant species that, even though we might not be aware of it, represent an important part of what we call genetic resources. Often lacking the physical characteristics that otherwise would make us pay attention, such as e.g. spectacular flowers, they are regularly equipped with different types of defenses like spines or thorns, burning or sticky glandular hairs, or bitter flavors. A good example of this is **prickly lettuce** (Lactuca serriola L.).

Nordic CWR project in iNaturalist

Help us to map the distribution of crop wild relatives (CWR) in the Nordic countries! You are invited to add your own observations to the Nordic CWR group at the iNaturalist portal. iNaturalist is an open, international and online citizen science portal for reporting biodiversity observations. Observations can be added directly at the website or by using a mobile app on your smartphone. Georeferenced observations with a species name that has been verified by at least one other person will be published in GBIF.

Nordic CWR iNaturalist group: http://www.inaturalist.org/projects/nordic-crop-wild-relatives

List of Nordic CWR species: http://www.inaturalist.org/lists/525787-Nordic-Crop-Wild-Relativess-Check-List?rank=species

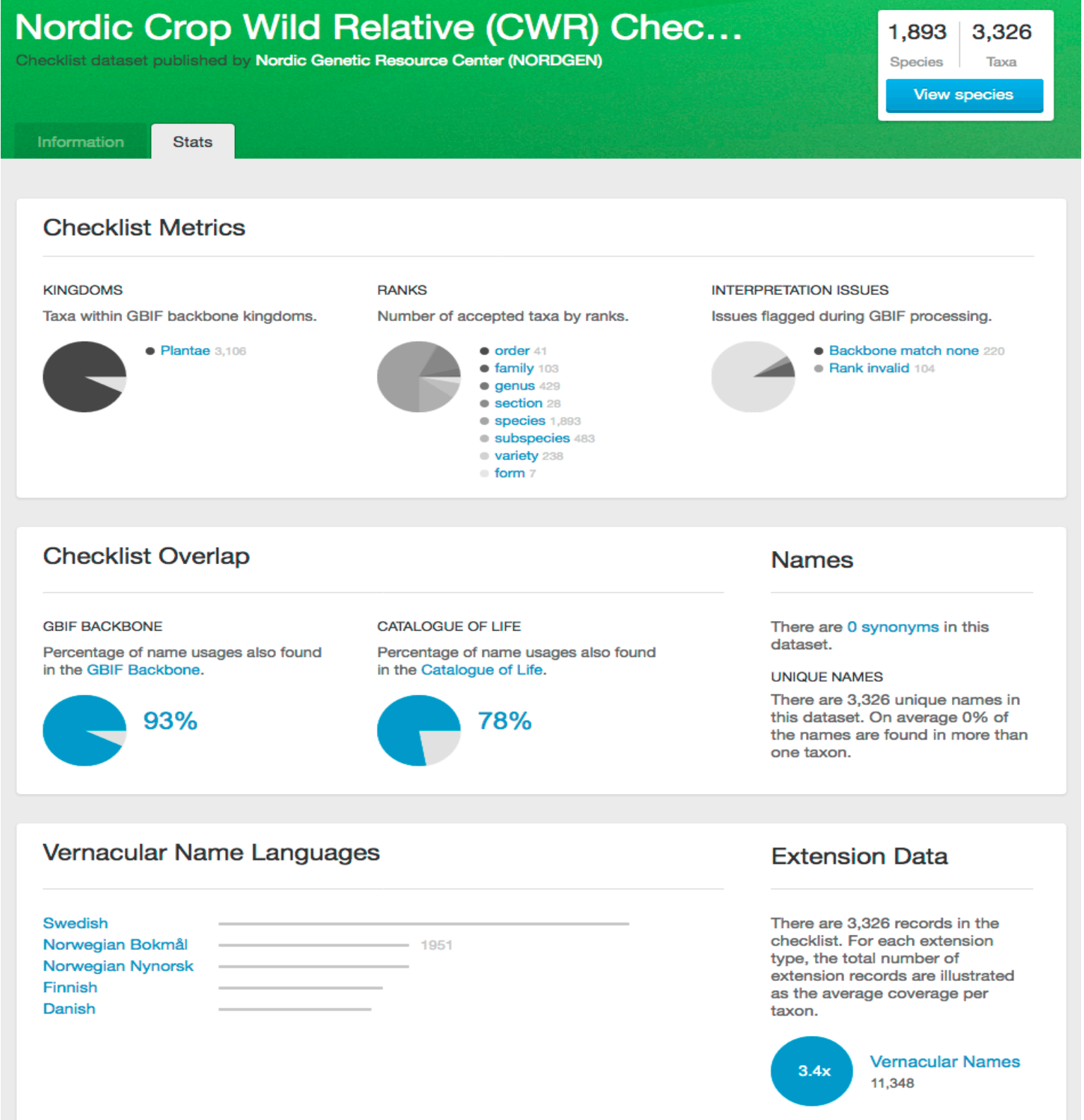


NordGen

"Ecosystem services: Genetic resources and crop wild relatives" (2015-2016)

"Wild genetic resources – a tool to meet climate change" (2017-2018)

Funded by the Nordic Council of Ministers (NMR)

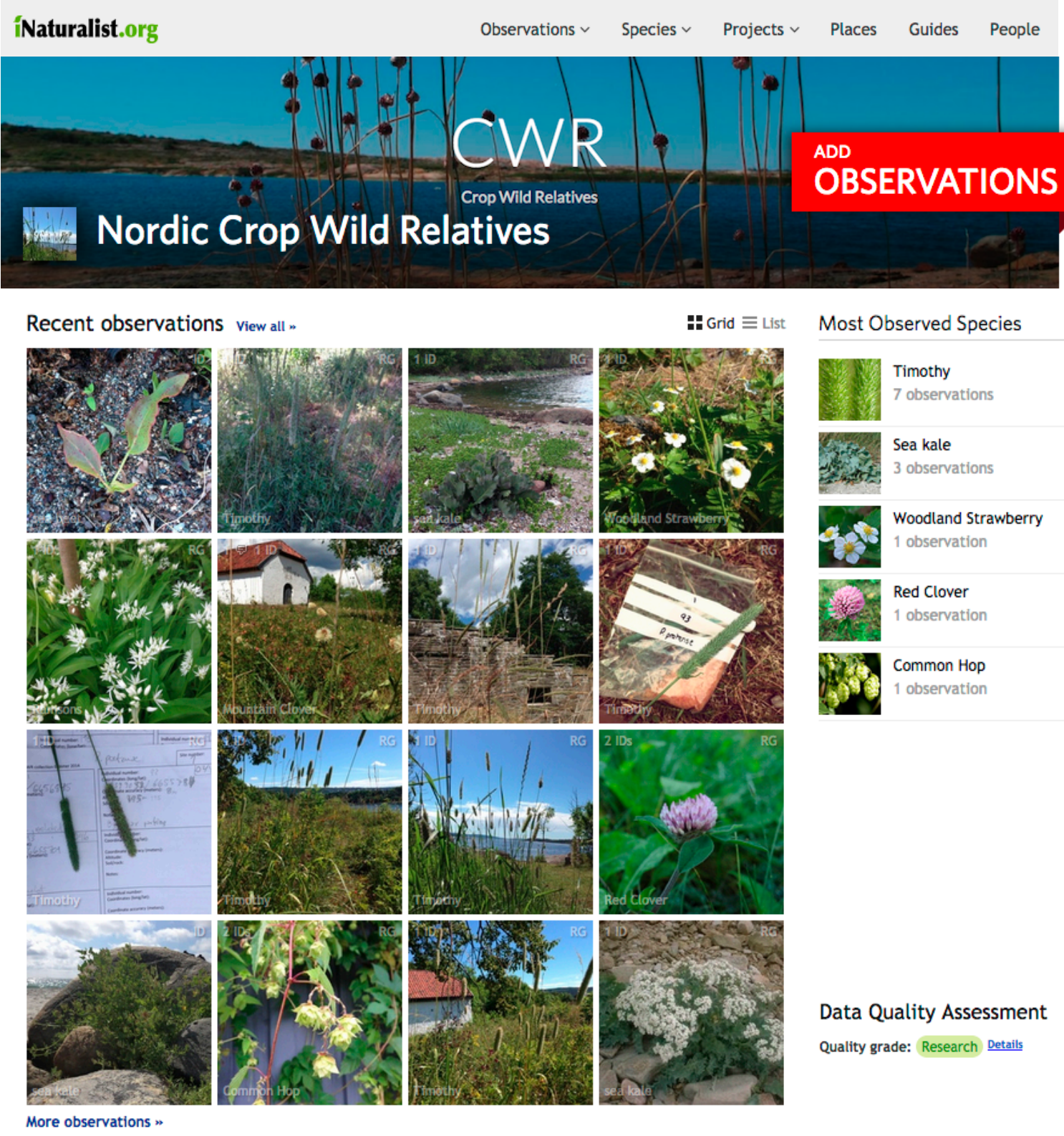


NordGen

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

doi:10.15468/itkype

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



iNaturalist

Add your own observations to this [Nordic CWR group in iNaturalist]

Observations peer-review validated by other amateur naturalists are published in GBIF

Climate change and national crop wild relative conservation planning

Authors | Authors and affiliations

Jade Phillips, Joana Magos Brehm, Bob van Oort, Åsmund Asdal, Morten Rasmussen, Nigel Maxted

Report

First Online: 18 February 2017

DOI: 10.1007/s13280-017-0905-y

Cite this article as:
Phillips, J., Magos Brehm, J., van Oort, B. et al. Ambio (2017). doi:10.1007/s13280-017-0905-y

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Examples of use for GBIF-mediated data

CWR conservation

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

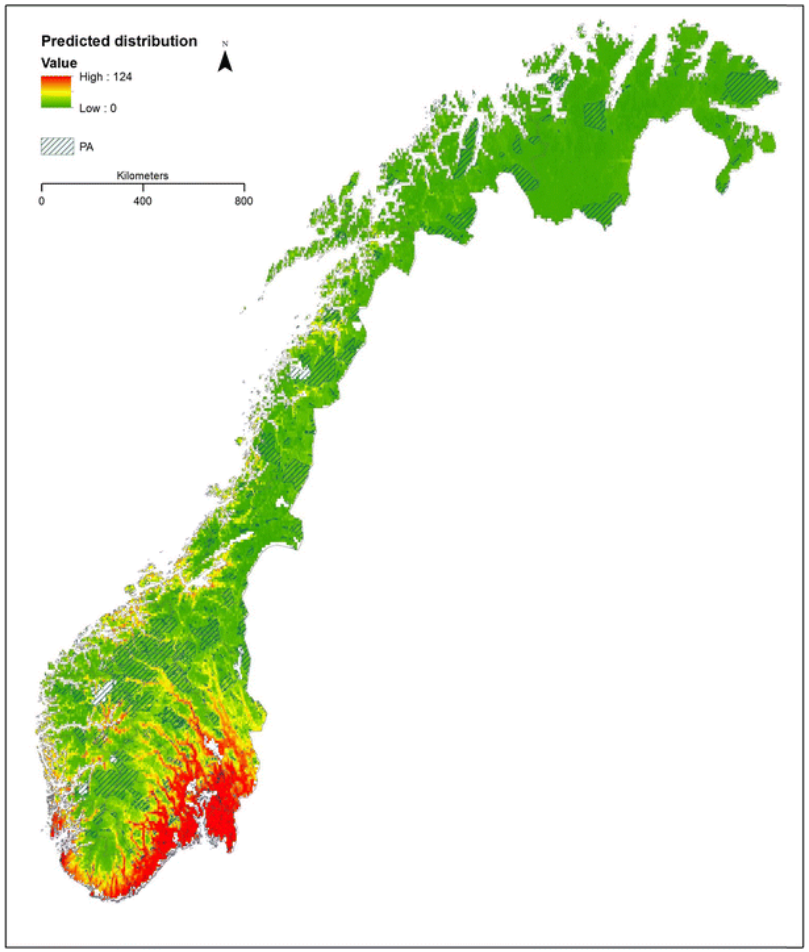

Figure. The predicted distribution of 187 priority CWR in Norway under the current climatic conditions. Red areas indicate taxon-rich areas with up to 124 taxa found there, and green areas indicate low taxon richness. Raster grid cell size 0.0416, approximately equal to 4 × 8 km2

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., Morten 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

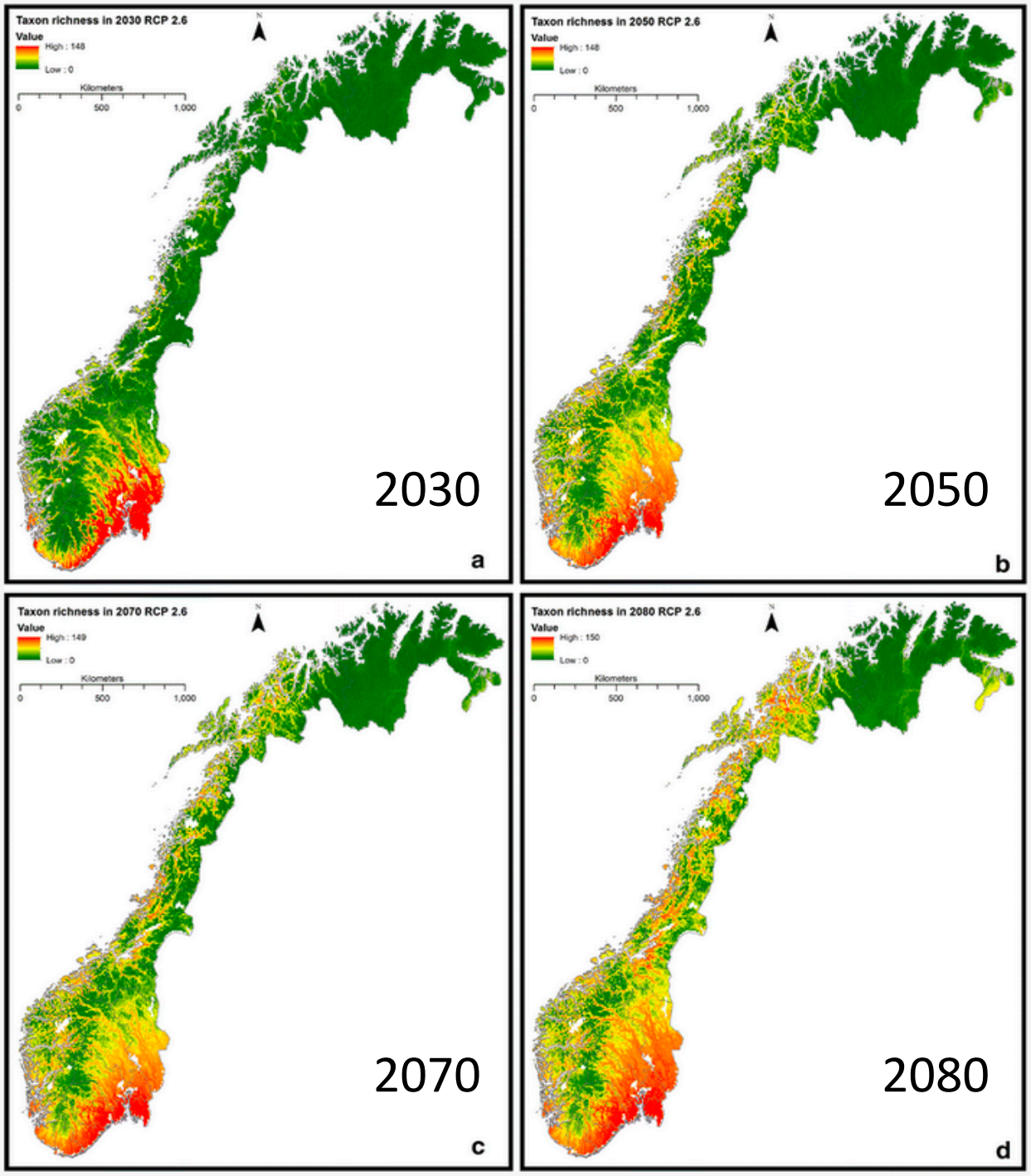

Figure. The average predicted taxon richness of 187 priority CWR in Norway under RCP 2.6 for the years **a** 2030, **b** 2050, **c** 2070, **d** 2080. Raster grid cell size 0.0416, approximately equal to 4 × 8 km^2 (Philips *et al*. 2017)

Examples of use for GBIF-mediated data

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

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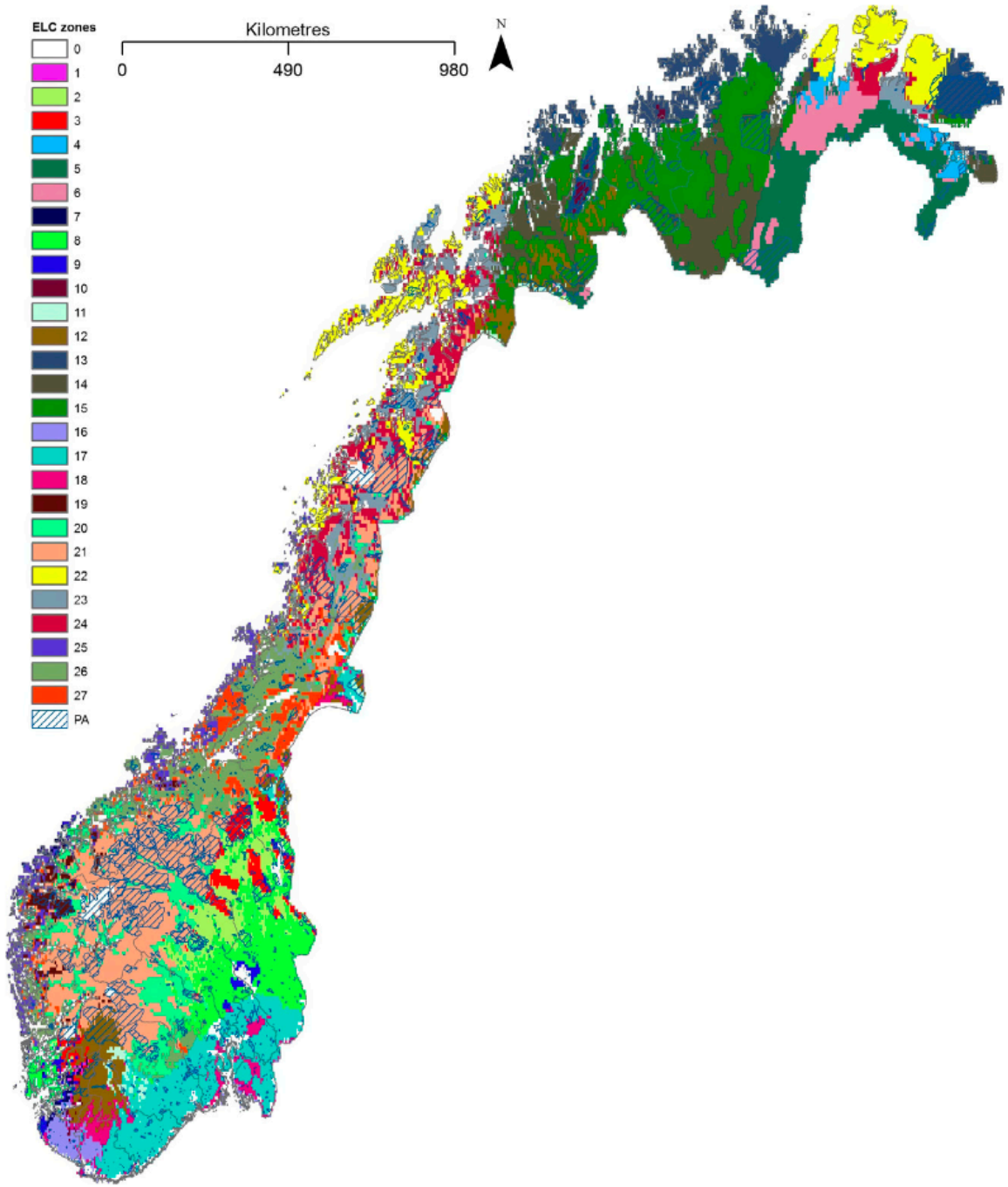

Figure 3 The ELC map for Norway composed of 27 ELC zones each representing a unique combination of environmental variables. See Table S8 for average values in each zone. Zone 0 refers to those areas where information for some of the components making up the map is missing. Variables used to create map: 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.

Examples of use for GBIF-mediated data

ELC maps

Development of a conservation plan for Crop Wild Relatives in Norway extracted the 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

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

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)

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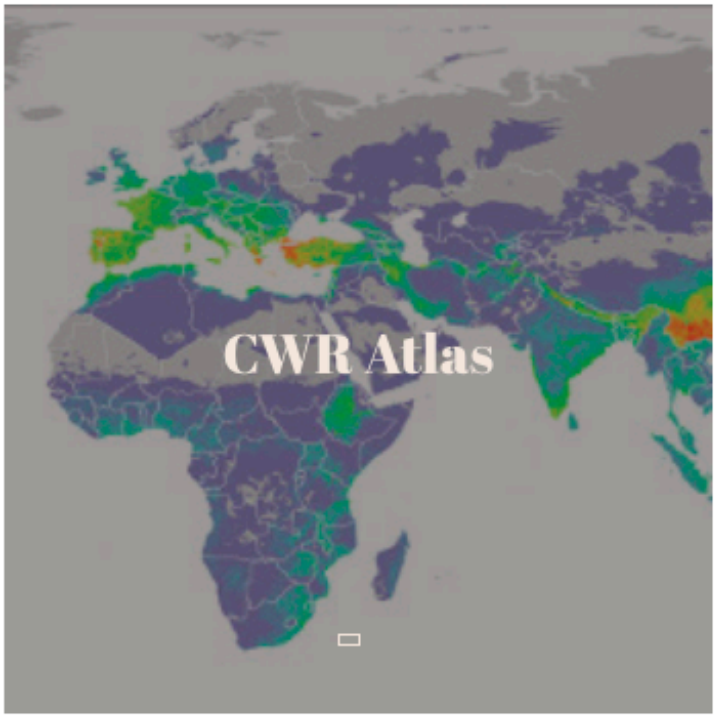
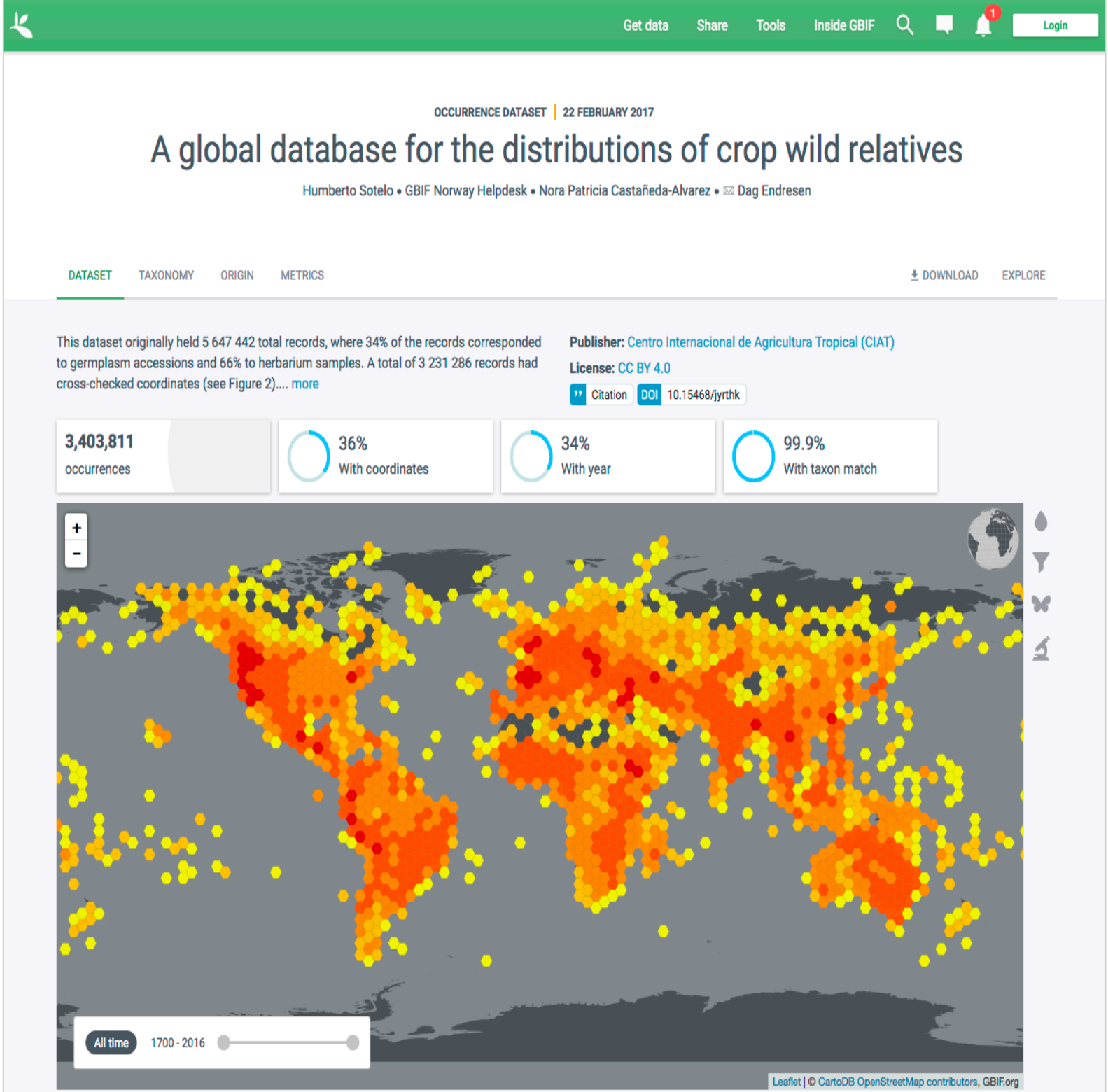
GBIF and Bioversity (2016) Final report of the task group on GBIF data fitness for use in agrobiodiversity. Global Biodiversity Information Facility, Copenhagen. http://www.gbif.org/resource/82283

Resources



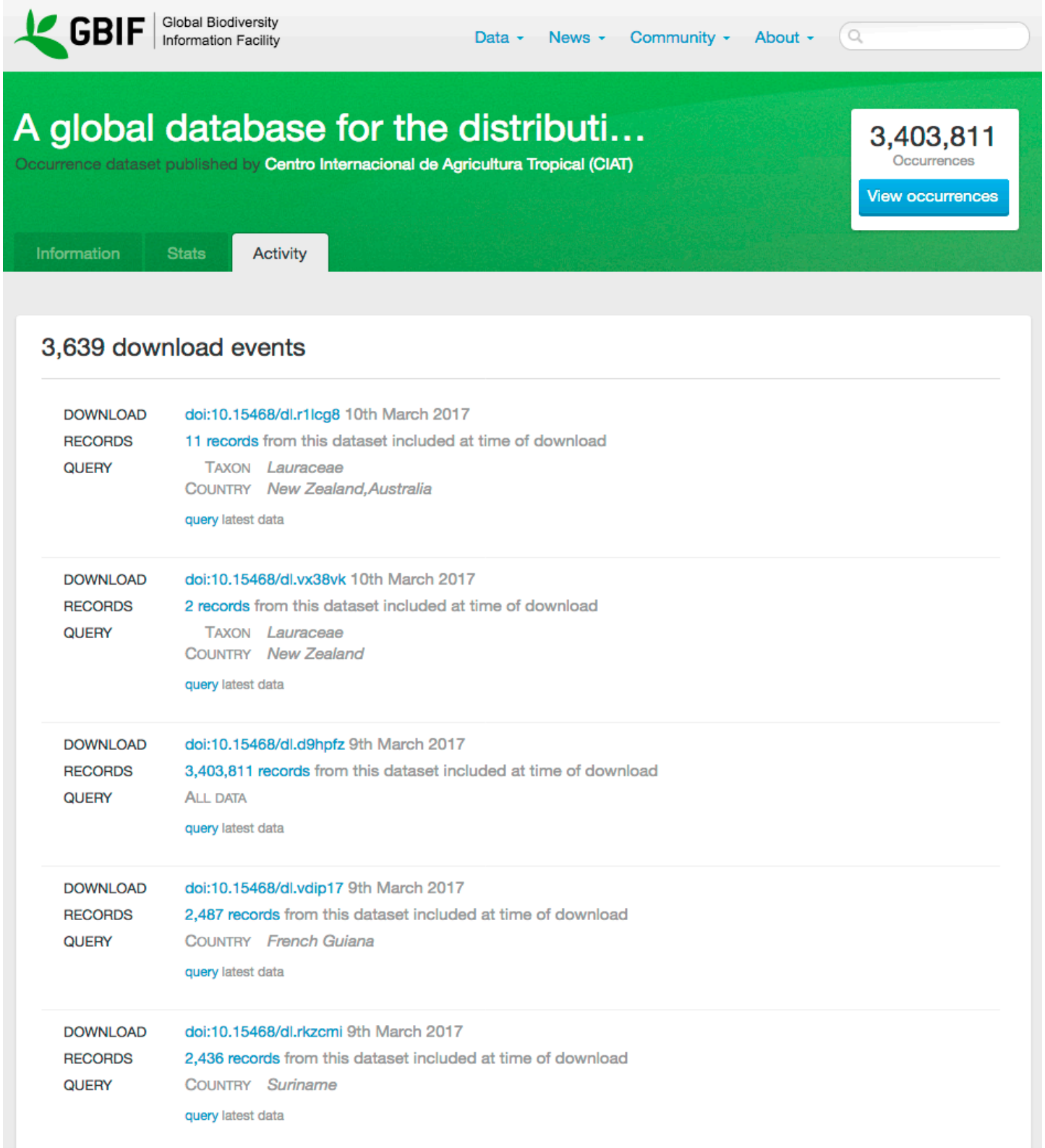


The Global Crop Wild Relative **Occurrence** Database include data from hundreds of data sources – including GBIF

The CWR Database is again published in GBIF (*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



crop wild relatives

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OCCURRENCE DATASET | REGISTERED 9 JUNE 2017

Bioversity Collecting Mission Database

Published by Bioversity International

Hannes Gaisberger • Dag Endresen • ✉ Imke Thormann

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DOI 10.15468/dl.3ddrn6
Date: 10 June 2017

Occurrences: 194,051
Involved Datasets: 615

Country Egypt

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DOI 10.15468/dl.89ynx2
Date: 10 June 2017

Occurrences: 194,051
Involved Datasets: 615

Country Egypt

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Bioversity International

Biodiversity Collecting Mission Database
158 252 occurrences

doi:10.15468/ulk1iz

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Global Biodiversity Information Facility
free and open access to biodiversity data.

GBIF Norway

UiO : Natural History Museum
University of Oslo