Plant collections – a global research infrastructure

Mari Källersjö

BOTANIS
GÖTEBORGS BOTANISKA T

VÄSTRA
GÖTALANDSRE


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

What is biodiversity?

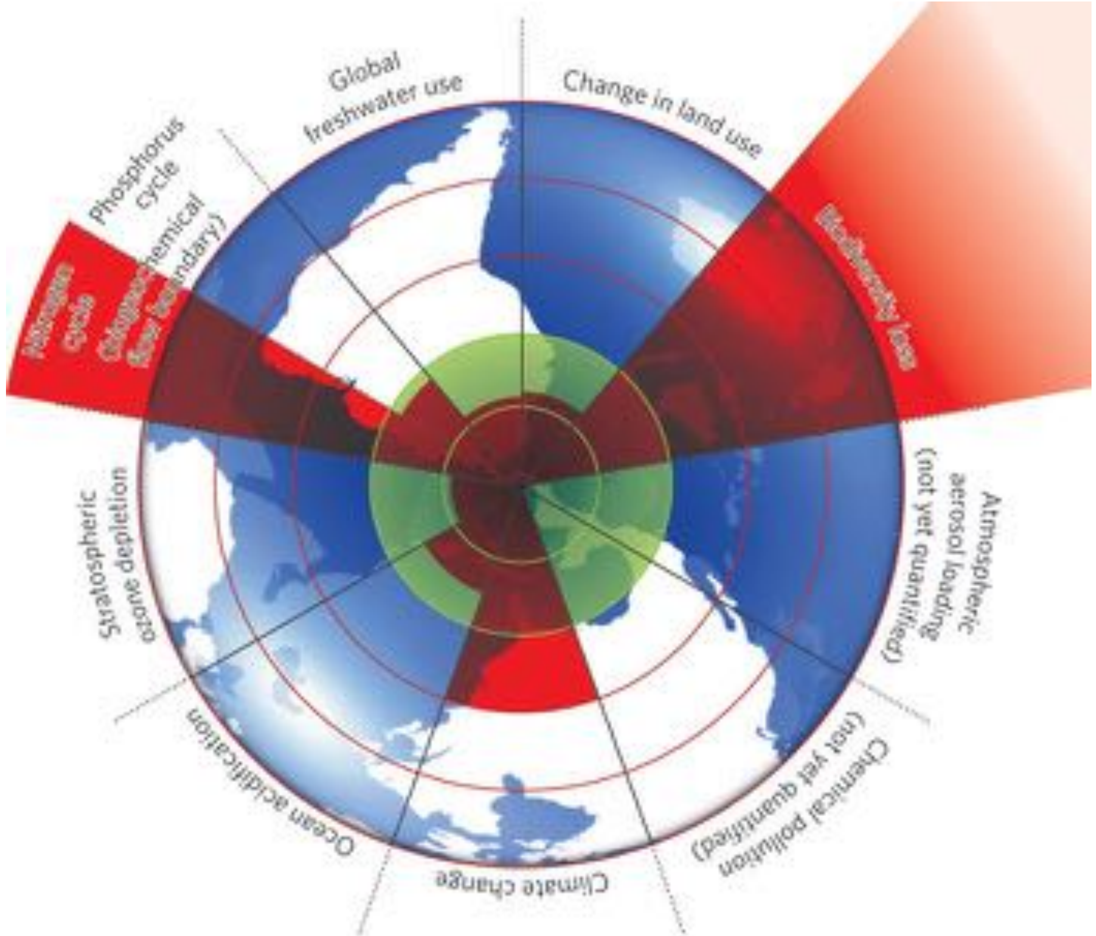
”Biological diversity" means the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

Biodiversity loss is a major societal challenge

A safe operating space for humanity

Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change

Rockström *et al.* (2009) *Nature*



We need to monitor and understand biodiversity

collecting

research

field work

Biological collections

Constitute our most important source of knowledge about Earth's biological diversity

>3 billion specimens

How are collections used?

- Species identification
- Vouchers
- Experiments -- breeding
- Integrated conservation
- DNA-studies, non-model organisms
- Studies of specific organisms or groups –anatomy, biogeography, ecology
- Environmental toxins, pathogens

Why a global perspective?

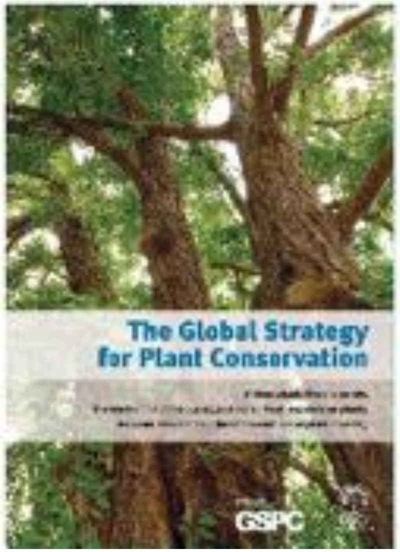
Species have no national boundaries. Few countries have the opportunity to take responsibility for the exploration and conservation of their own biodiversity. We must jointly build a better knowledge of the unique flora and fauna in the world's rich areas.

BGCI
Plants for the Planet

1987

Convention on
Biological Diversity

1992



GSPC, 2002

What is a research infrastructure

European Strategi Forum for Research Infrastructures

Access to shared research infrastructure is a prerequisite for the highest quality of research. Tools for research are often so sophisticated or costly that national or international interaction is necessary.

http://roadmap2018.esfri.eu/

DiSSCo

Distributed System of Scientific Collections

Vision & Mission
for Swedish Taxonomic Facilities

DiSSCo

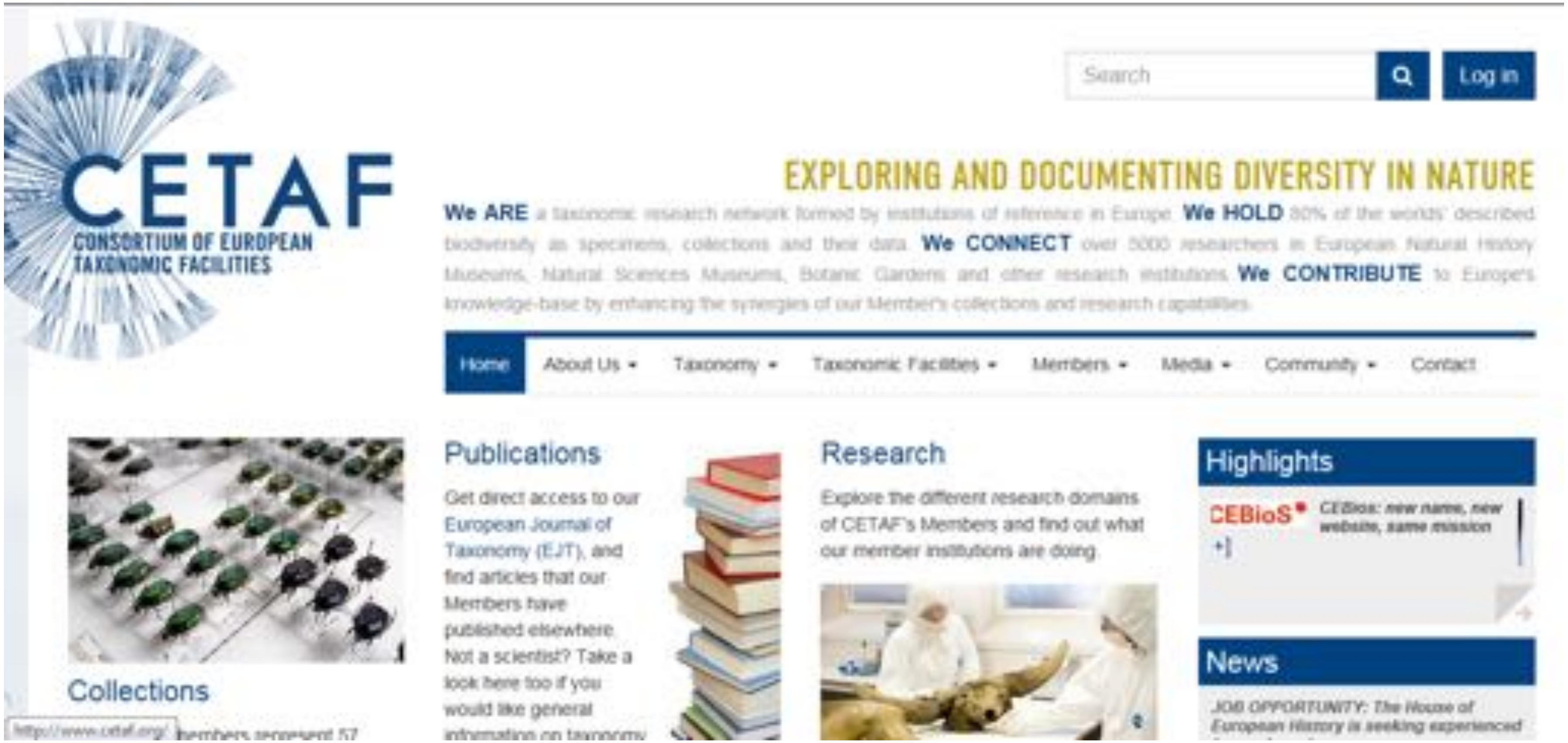
Distributed System of Scientific Collections

115 National Facilities
21 Countries

- **Largest ever formal agreement** between natural science collection facilities
- **A system of distributed facilities**
- **Centralised shared governance** model

a new business model:
ONE EUROPEAN COLLECTION

- **One European Collection** of scientific assets
- **Common Collections development** strategy
- **Economies of scope and scale**
- **Monitoring impact** of collections (documenting ROI)
- **Specialisation strategies** (e.g. in alignment with national priorities, e.g. Smart Specialisation Strategies)
- **Joint Research Agendas**


CETAF
CONSORTIUM OF EUROPEAN TAXONOMIC FACILITIES
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EXPLORING AND DOCUMENTING DIVERSITY IN NATURE
We ARE a taxonomic research network formed by institutions of reference in Europe. We HOLD 80% of the worlds' described biodiversity as specimens, collections and their data. We CONNECT over 5000 researchers in European Natural History Museums, Natural Sciences Museums, Botanic Gardens and other research institutions. We CONTRIBUTE to Europe's knowledge-base by enhancing the synergies of our Member's collections and research capabilities.
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Highlights
CEBioS
CEBios: new name, new website, same mission
News
JOB OPPORTUNITY: The House of European History is seeking experienced
Collections
http://www.cetaf.org/
members represent 57

GBIF

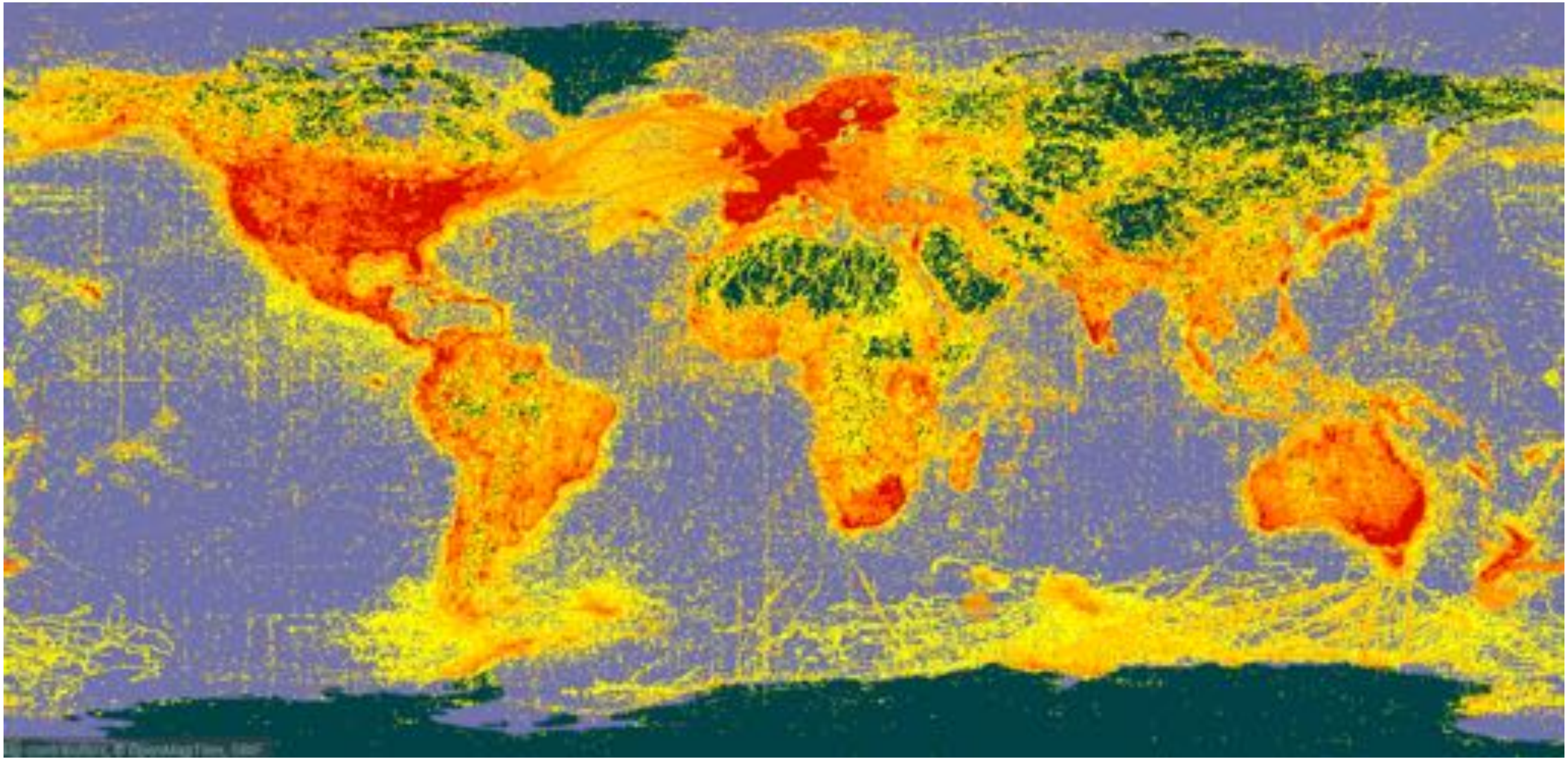
established in 2001, OECD
(Organization for Economic Cooperation and Development)

megascience-project

53 countries and 43 international organisations

"To facilitate free and open access to biodiversity data worldwide, via the Internet, to underpin scientific research, conservation and sustainable development."

Occurrence records	Datasets	Publishing institutions	Peer-reviewed papers using data
1 302 735 625	44 440	1 399	3 632



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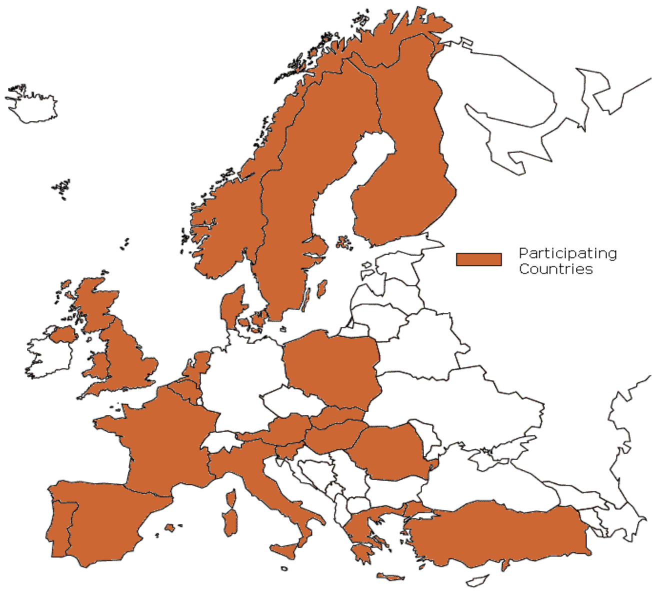
LifeWatch

E-Science and Observatory Infrastructure for Biodiversity & Ecosystem Science

EU-project 7th Framework Programme

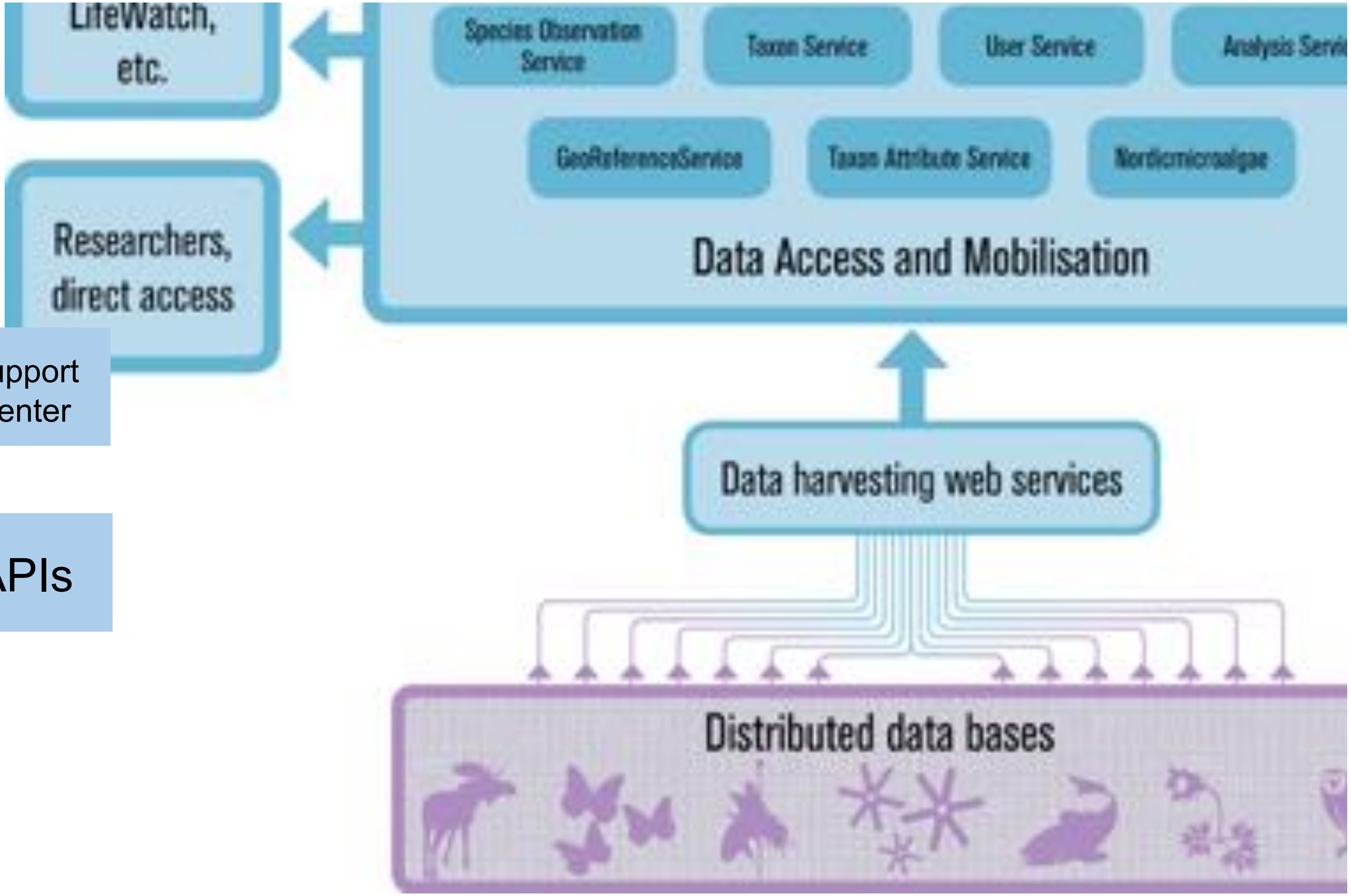
European Research Infrastructure Consortium (ERIC) 2017



burg.

Swedish Biodiversity Data Infrastructure

tion: The workshop 'P



Support Center

APIs

Figure 1. Overview of the Swedish Lifewatch (SLW) structural organisation. SLW is an e
vesting observation data from 15 different distributed databases, harmonising, quality che

The Analysis portal for biodiversity data

SWEDISH LIFEWATCH

Start | Data | Filter | Settings | Result | Info | My Pages

Data › **Species observations (databases)**

Save settings | Download metadata

	Data provider	Number of observations	Number of public observations
☑	Species Observations System (Artportalen) (Swedish Species Information Centre (ArtDatabanken))	65,722,514	65,316,743
☑	Observation database of Redlisted species (Swedish Species Information Centre (ArtDatabanken))	725,929	0
☑	MVM (Environmental data MVM, SLU)	1,194,484	1,194,484
☑	The National Register of Survey test-fishing (NORS) (Department of Aquatic Resources, SLU)	2,693,173	2,693,173
☑	The Database for electrofishing in streams (SERS) (Department of Aquatic Resources, SLU)	407,425	407,425
☑	Wireless Remote Animal Monitoring (WRAM) (Umeå Center for Wireless Remote Animal Monitoring (UC-WRAM), SLU)	7,906	7,906
☑	Shark SMHI (SMHI)	620,834	620,834
☑	The database for coastal fish (KUL) (Department of Aquatic Resources, Institute of Coastal Research, SLU)	231,079	231,079
☑	Bird ringing centre in Sweden via GBIF (Swedish Museum of Natural History)	4,821,039	4,814,212
☑	Porpoises (NRM) via GBIF (Swedish Museum of Natural History)	2,191	2,191
☑	Entomological Collections (NHRS) from GBIF (Swedish Museum of Natural History)	35,528	35,525
☑	Swedish Malaise Trap Project (SMTP) from GBIF (Foundation Station Linné)	95,992	95,992
☑	Swedish Virtual Herbarium (Umeå University)	2,316,183	2,309,060
☑	Tree Gateway (Swedish Species Information Centre (ArtDatabanken))	583,774	583,774
☑	Clam Gateway (Swedish Species Information Centre (ArtDatabanken))	[illegible]	13,246
	Sum	**79,471,297**	**78,325,644**

At least one data provider must be selected

My selections

Data
- Data Providers (15 selected)

Filter
- ☑ Occurrence

Settings
- Summary statistics
- Grid statistics
- Time series
- Coordinate system
- Table columns
- File format

Reset

App 80 million measurements & observations from Sweden (excl. sequence and image data)


Swedish Lifewatch

SVENSKA | SLU.SE

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swedish lifewatch / news / news archive 2018 / Ny supporttjänst

SLU news

Swedish LifeWatch support

PUBLISHED: 18 OCTOBER 2018

Welcome to the Swedish LifeWatch service network. We offer user support to scinetists and investigators with the goal to promote new and inter-disciplinary research on biological diversity, ecosystems, and conservation of nature.

Our experts can help with:

- Aquisition, delivery and formating of relevant datasets
- Processing and refinement of datasets from biological sensors, inventory- or monitoring programs
- Expertise and consultancy in publishing biodiversity data
- Analytical support and help with relevant analtytical tools
- Development of new or linking to exsiting data services with our infrastructure
- Education in biodiversity informatics

Please contact us under the address: debora.arlt@slu.se

CONTACT

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SHARE

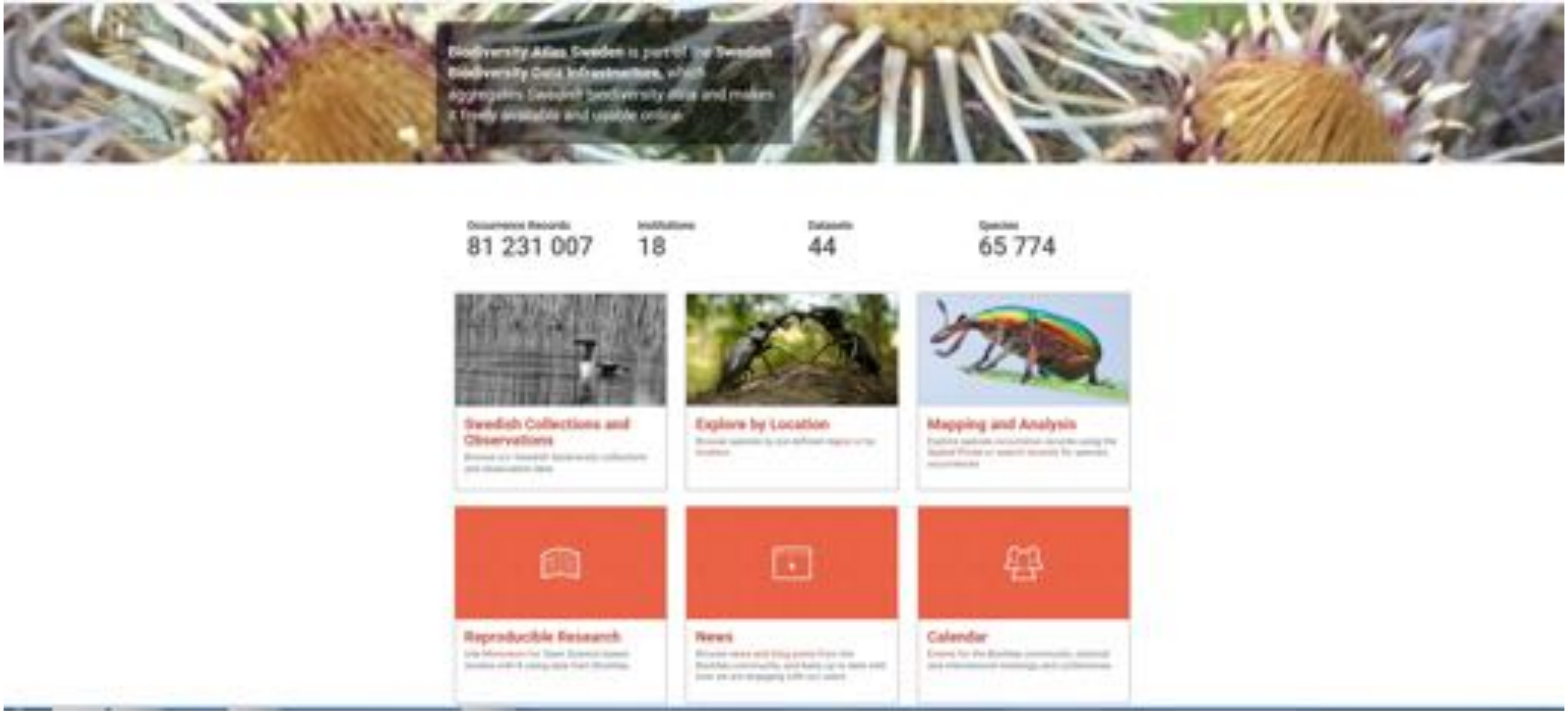
Swedish LifeWatch becomes Swedish Biodiversity Data Infrastructure

LAST CHANGED: 05 FEBRUARY 2019

Swedish LifeWatch and Biodiversity Atlas Sweden are the key e-infrastructures facilitating biodiversity and ecosystems research in the emerging landscape of biodiversity information systems in Sweden.

Swedish LifeWatch and Biodiversity Atlas Sweden will merge into the joint Swedish Biodiversity Data Infrastructure, a single e-infrastructure in close collaboration with the Living Atlases community.

During 2019-2020 both partners will closely collaborate to create the joint infrastructure SBDI – continuing to make biodiversity data accessible, providing powerful analysis and visualization tools, and so offering opportunities for innovative, interdisciplinary research on biodiversity and ecosystems. Given continuous funding by the Swedish Research Council, the merger will conclude with the formal establishment of the SBDI consortium in 2021.

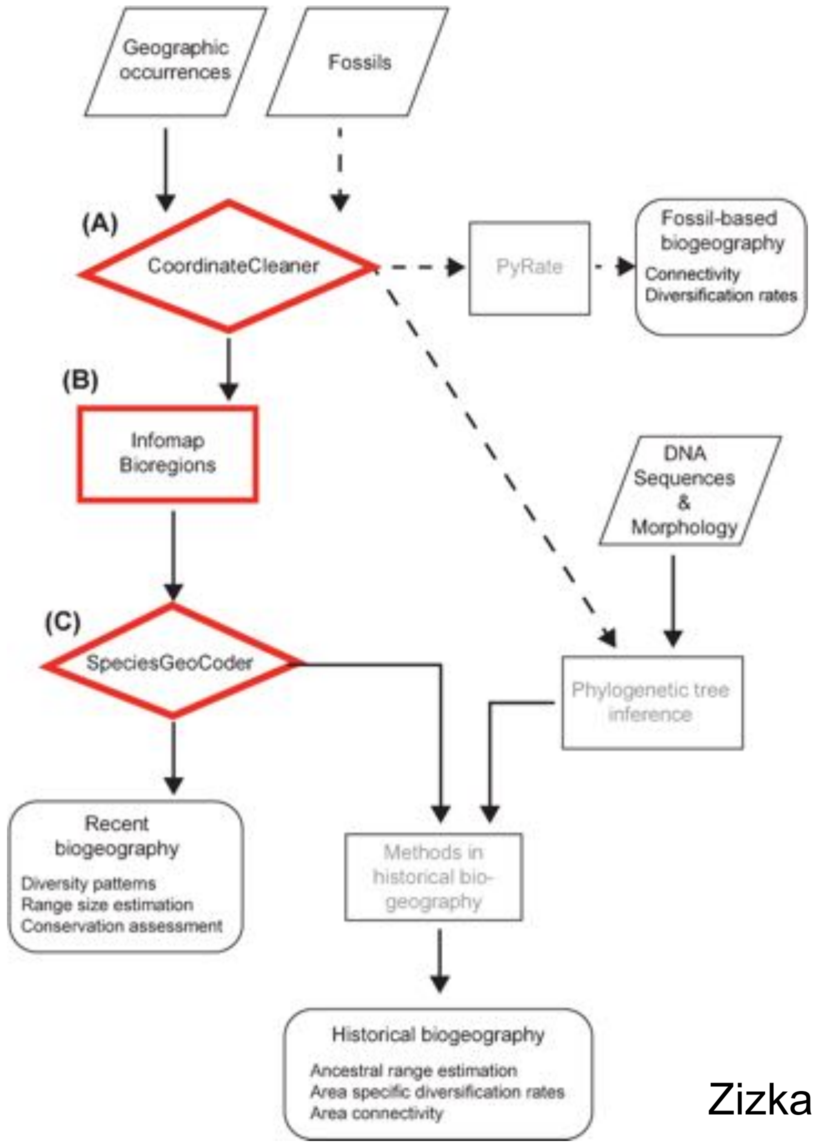

Biodiversity Atlas Sweden is part of the Swedish Biodiversity Data Infrastructure, which aggregates Swedish biodiversity data and makes it freely available and usable online.
Occurrence Records
81 231 007
Institutions
18
Datasets
44
Species
65 774
Swedish Collections and Observations
Explore by Location
Mapping and Analysis
Reproducible Research
News
Calendar

Big data

A new field of research based on information from databases

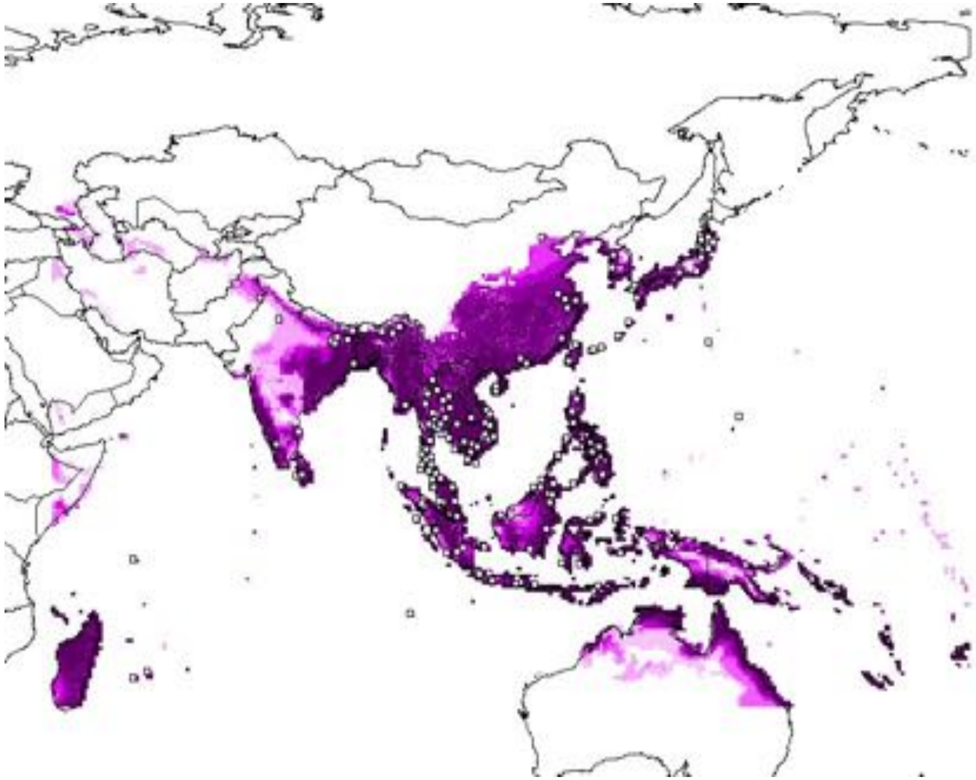
Global change on vegetation: environmental data, species occurrences, community plots and species traits

Follow changes in time and space



Zizka, 2018

Tiger mosquito– native range……

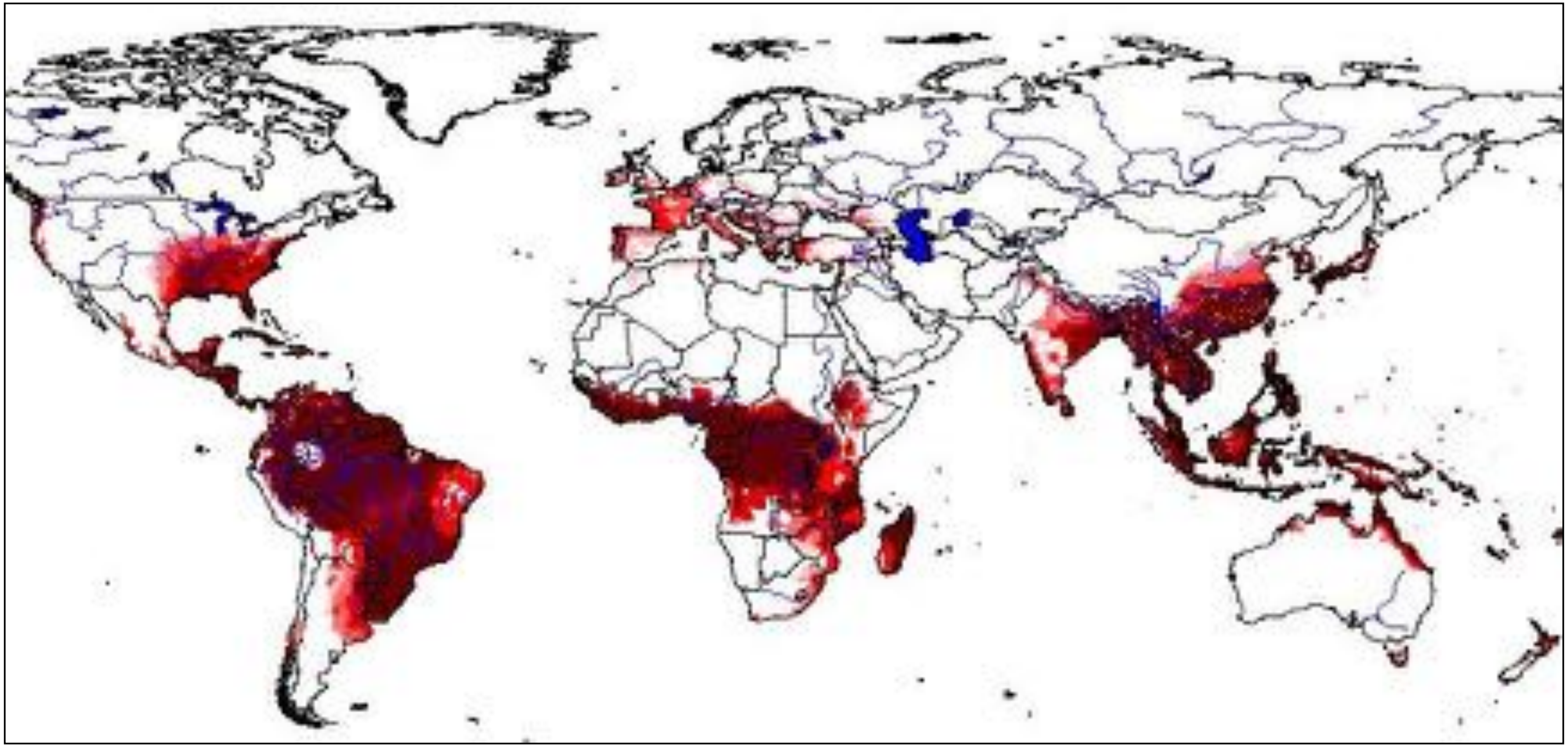


Modeled native range in Asia from specimens & observations

Vector for pathogens, yellow fever, dengue fever, Zika virus

Started spreading in the 1960s

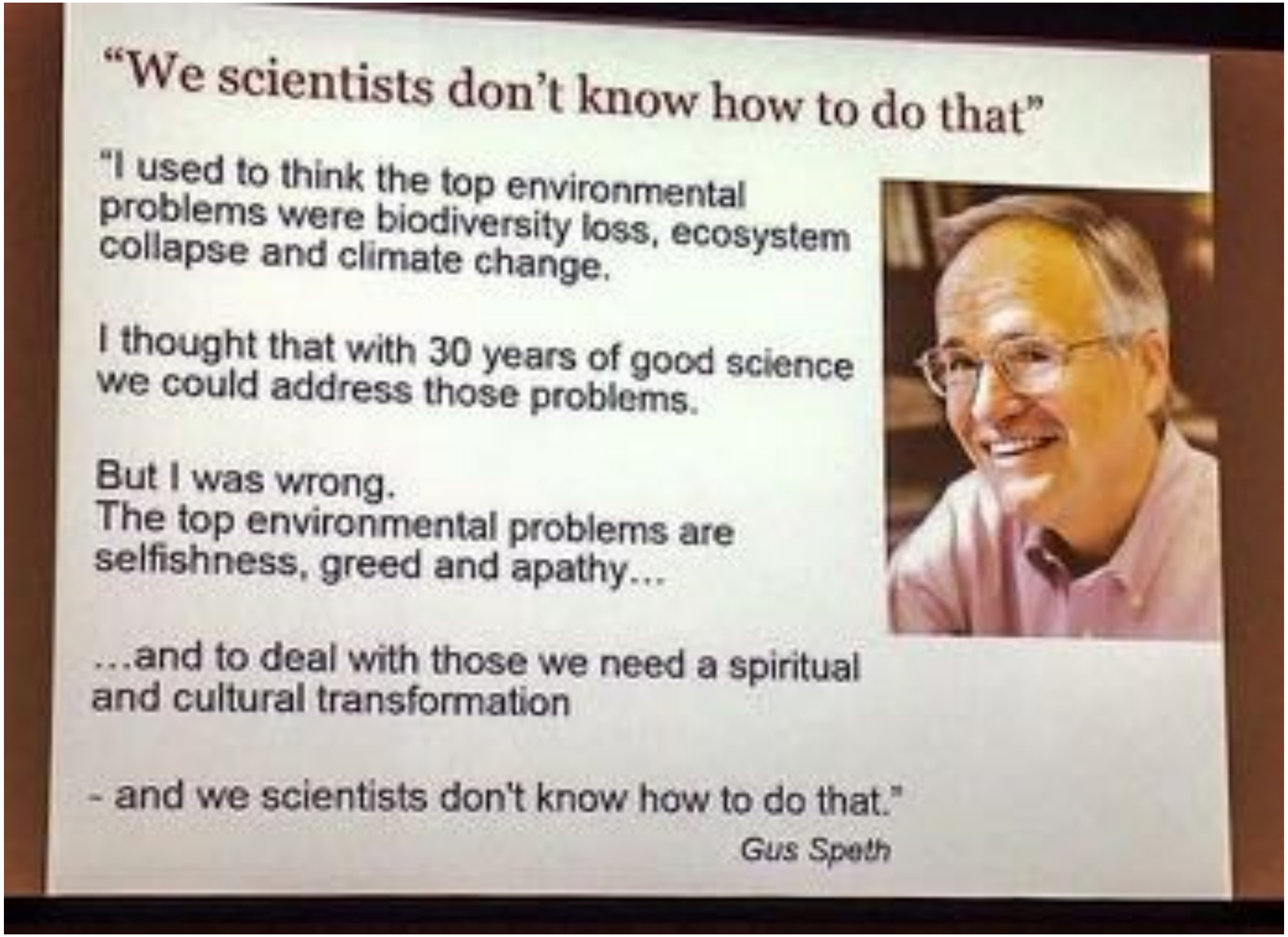
Asian Tiger mosquito: world risk-map (present climate niches)



To publish or not to publish data

- The information is incomplete
- The information is suspected to have errors
- The specimen might be misidentified
- The documentation on how the material was obtained may not satisfy EU-regulations on Nagoya protocol.

Always publish!!


"We scientists don't know how to do that"
"I used to think the top environmental problems were biodiversity loss, ecosystem collapse and climate change.
I thought that with 30 years of good science we could address those problems.
But I was wrong.
The top environmental problems are selfishness, greed and apathy…
…and to deal with those we need a spiritual and cultural transformation
- and we scientists don't know how to do that."
Gus Speth

Gothenburg Global Biodiversity Center

2016

BOTANISKA
GÖTEBORGS BOTANISKA TRÄDGÅRD

CHALMERS
UNIVERSITY OF TECHNOLOGY

NORDENS ARK

SJÖFARTSMUSEET AKVARIET GÖTEBORG

GÖTEBORGS naturhistoriska museum

universeum

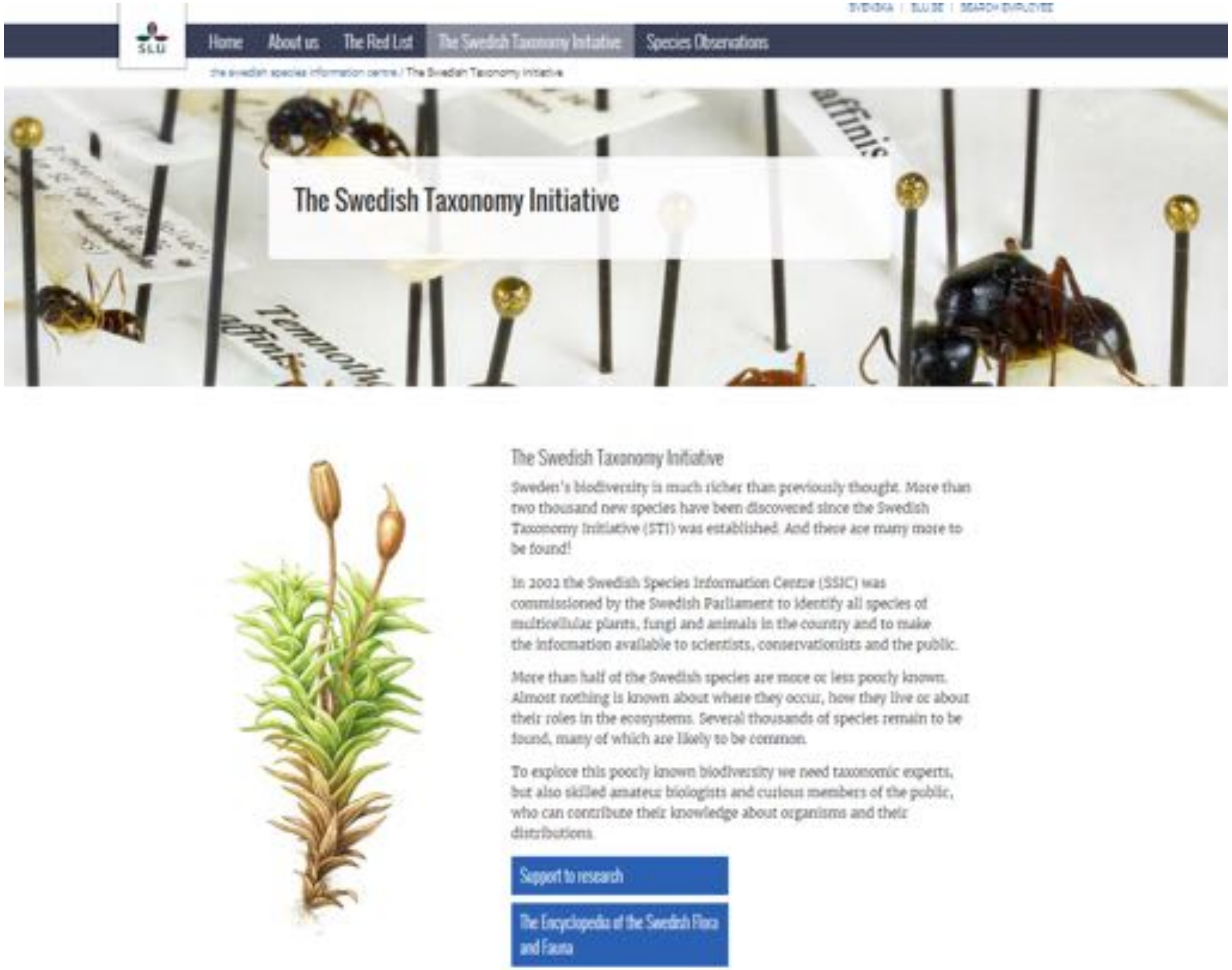
UNIVERSITY OF GOTHENBURG

UNIVERSITY OF GOTHENBURG

- HERBARIUM GB
- DEPARTMENT OF MARINE SCIENCES
- DEPARTMENT OF BIOLOGICAL AND ENVIRONMENTAL SCIENCES (BIOENV)
- DEPARTMENT OF EARTH SCIENCES
- CENTRE FOR SEA AND SOCIETY
- THE LINNEAUS CENTRE FOR MARINE BIOLOGY (CEMEB)


RESEARCH
ENGAGEMENT &
EMPOWERMENT
I.E. PEOPLE TAKE ACTION TO
REDUCE BIODIVERSITY LOSS
OUTREACH


Thank
you!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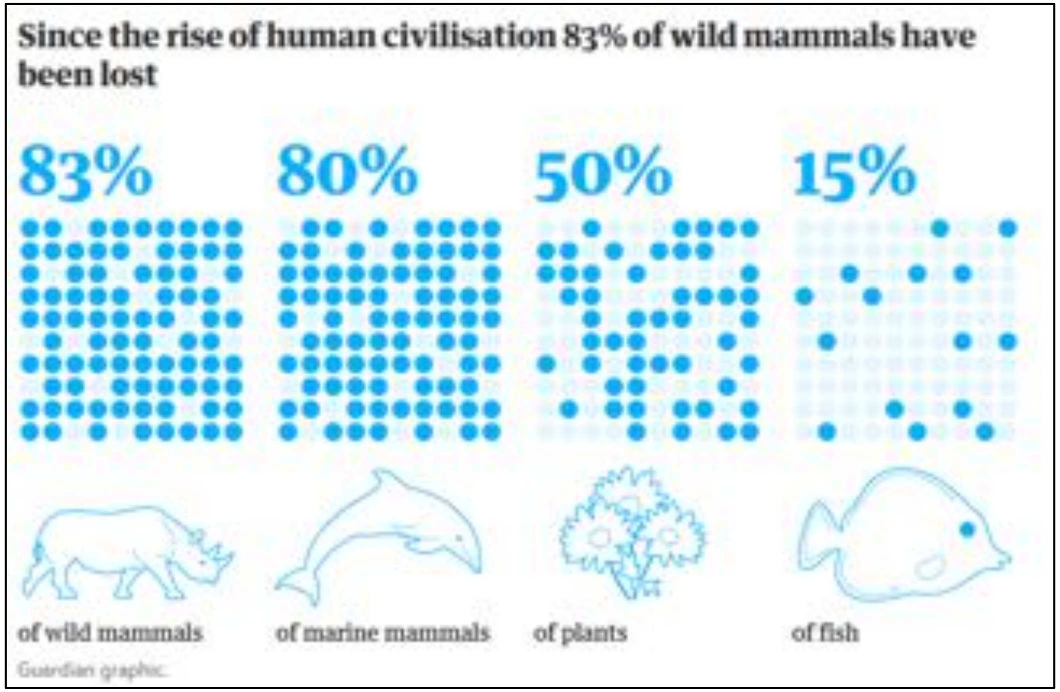
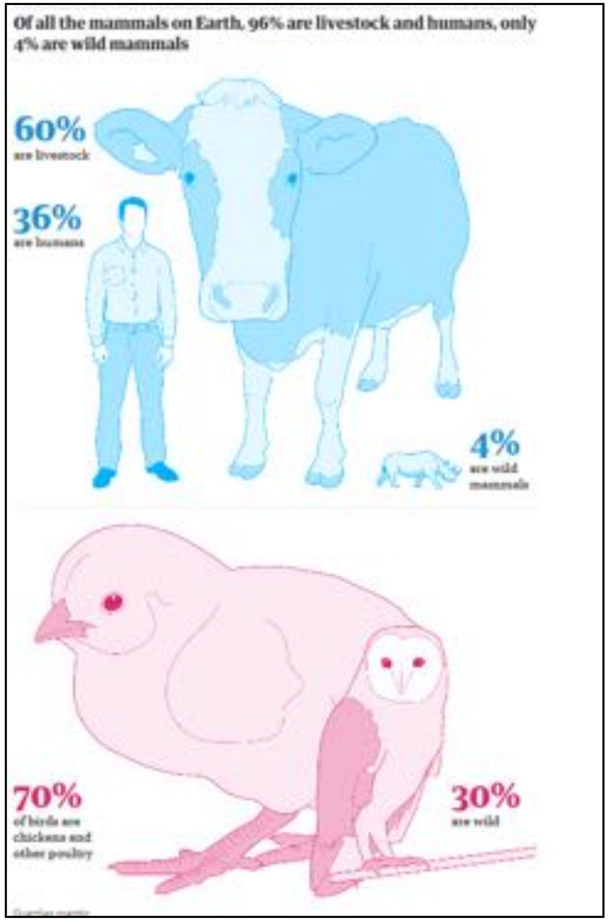
The Swedish Taxonomy Initiative
Species Observations
the swedish species information centre / The Swedish Taxonomy Initiative
The Swedish Taxonomy Initiative
The Swedish Taxonomy Initiative
Sweden's biodiversity is much richer than previously thought. More than two thousand new species have been discovered since the Swedish Taxonomy Initiative (STI) was established. And there are many more to be found!
In 2002 the Swedish Species Information Centre (SSIC) was commissioned by the Swedish Parliament to identify all species of multicellular plants, fungi and animals in the country and to make the information available to scientists, conservationists and the public.
More than half of the Swedish species are more or less poorly known. Almost nothing is known about where they occur, how they live or about their roles in the ecosystems. Several thousands of species remain to be found, many of which are likely to be common.
To explore this poorly known biodiversity we need taxonomic experts, but also skilled amateur biologists and curious members of the public, who can contribute their knowledge about organisms and their distributions.
Support to research
The Encyclopedia of the Swedish Flora and Fauna

A sixth mass extinction



WWF 2014



The biomass distribution on Earth, Yinon M. Bar-On, Rob Phillips, and Ron Milo, PNAS 2018