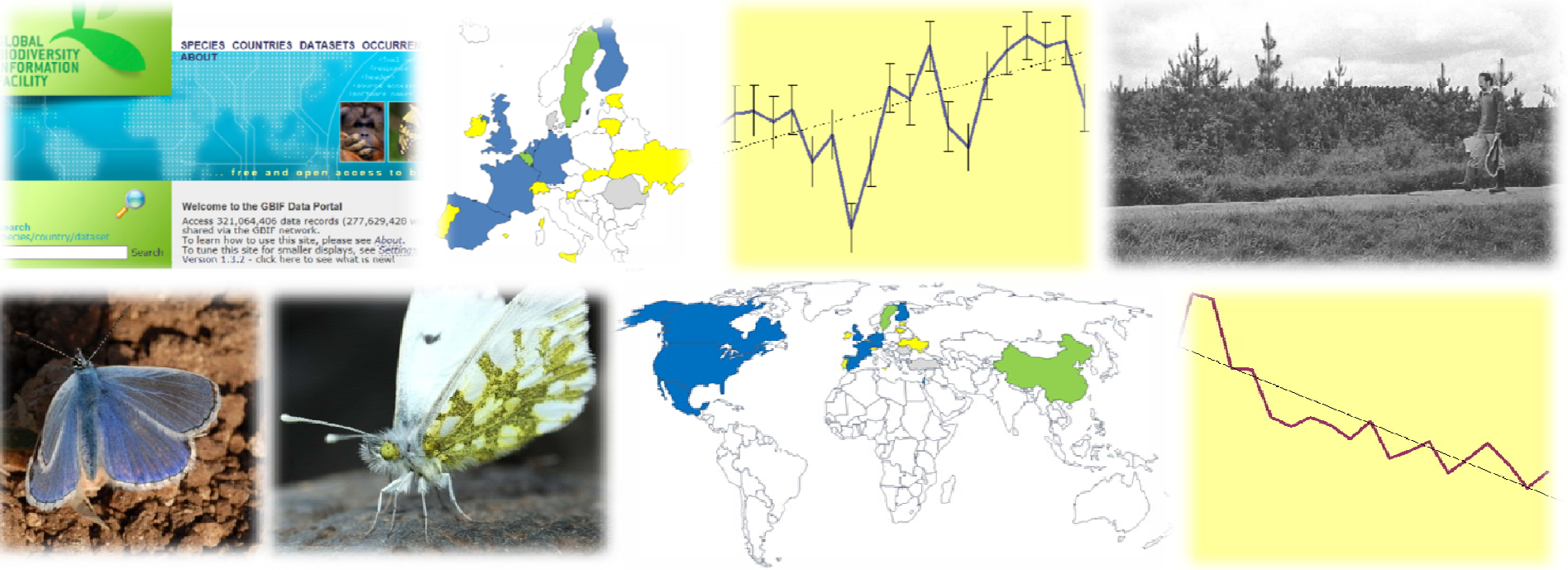


Butterfly Monitoring Schemes: Expansion through 35 years



Guy Pe'er
Dept. Conservation Biology
UFZ – Helmholtz Centre for Environmental Research

Butterfly monitoring workshop, May 2012



Overview

Part 1:

- **Butterfly Monitoring Schemes (BMS): brief history**
- **How does it work? The German experience**
- **What does it give us?**

Part 2:

- **Beyond BMS: Other sampling efforts & protocols**
- **Challenges**
- **Prospects: efforts for integration**



Where it all started

**UK: systematic monitoring since 1976,
“Pollard walk” established (Pollard 1977)**



Where it all started

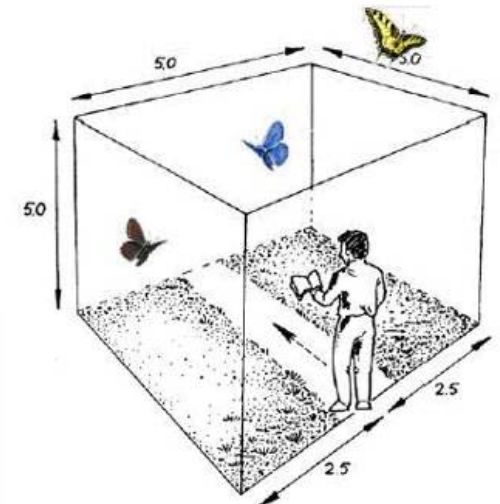
**UK: systematic monitoring since 1976,
“Pollard walk” established (Pollard 1977)**

Quietness for about 13 years?... until...
the development of first Atlas's (Chris van Swaay, Pers. Comm.).

1990s: rapid expansion following the Dutch protocol.

Elements of the success:

1. One simple protocol
2. Effective communication which builds on
 - Charisma of butterflies
 - Realization of importance (“citizen science”)
 - Motivation



© Chris van Swaay

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ENVIRONMENTAL
RESEARCH - UFZ

Expansion through Europe and beyond

**UK: systematic monitoring since 1976,
now 10,000 observers**

Ukraine: since 1983

Illinois, USA 1987

Netherlands 1990

Belgium 1991

Spain 1994

Ohio, USA 1995

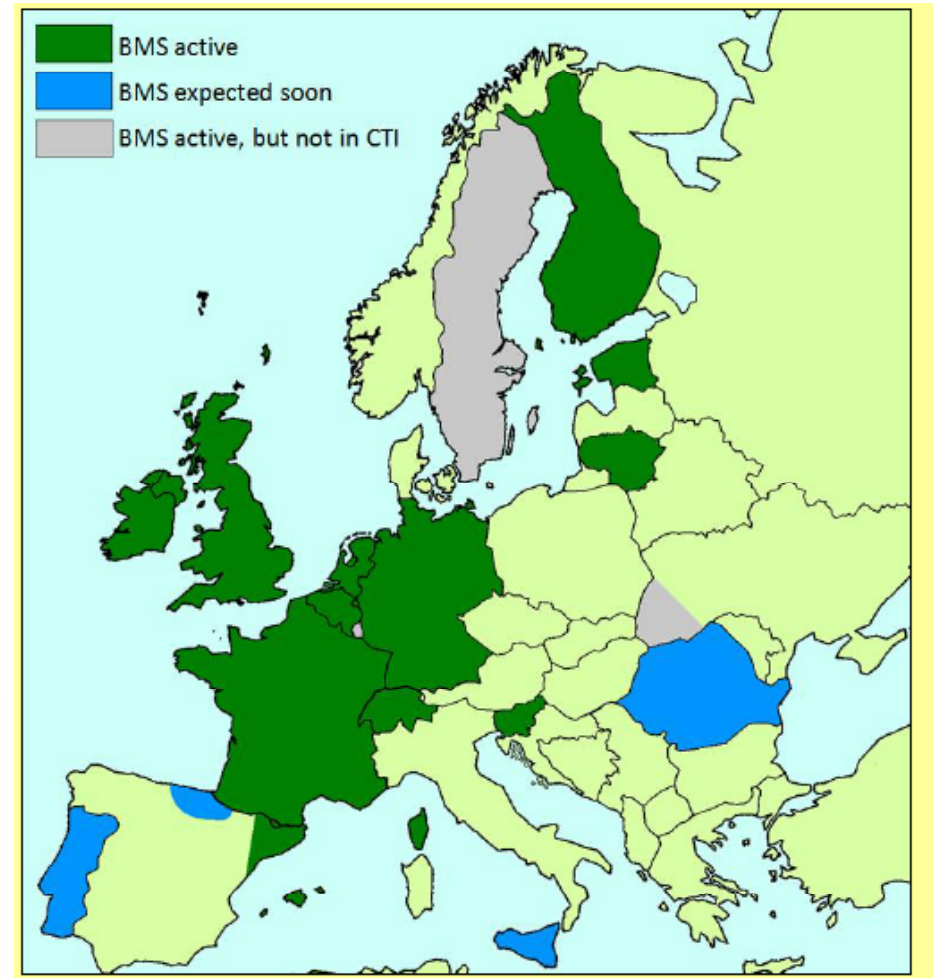
Switzerland 1998

Finland 1999

etc...

...etc...

... etc...



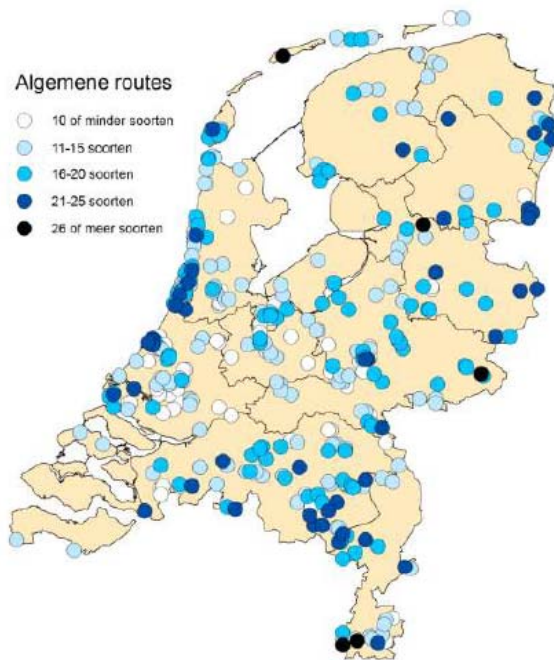
Country	Intensive	Established	Sites	Samples / yr
United Kingdom		1976	1200	15-26
The Netherlands		1990	430/ 950	15-20
Ukraine - Carpathians	Proff.	1990	158	2-10
Belgium		1991	98	1-26
Spain (Catalonia, Andorra)		1994	115	30
Portugal		1998-2006	0	3-5
Finland	30% Prof.	1999	70	8-10
Germany (Nordhein Westfalen)		2001	50	15-20
France (RNF)		2002	100	10-15
Switzerland	Proff.	2003	100	10
Jersey (France)		2004	15	15-25
Estonia	Proff	2004	10	9
Germany		2005	400	15-20
Ireland		2007	63	16.3
Slovenia		2007	14	6-8
Luthuania		2009	14	6-9
Israel		2009	40	3-20
Luxemburg		2010		
Sweden		2010	59	5-20
China		2010	28	
Russia		plans	30	

Expansion through Europe and beyond

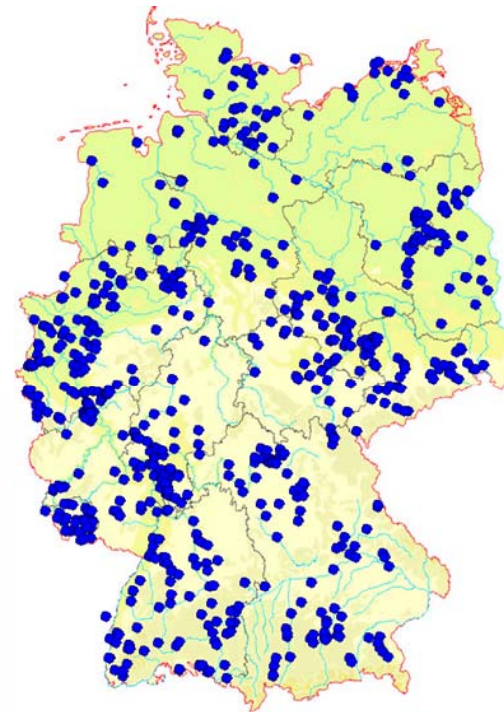
Currently in Europe:

- > 3000 transects walked regularly in 15 countries
- Each year, volunteers count once around the world (40,000 km)
- Dutch BMS alone = 200,000 records per year

Holland, 450 transects



Germany, 700 transects



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RESEARCH - UFZ

How does it work? The German Experience

ISRAEL JOURNAL OF ECOLOGY & EVOLUTION, Vol. 54, 2008, pp. 89–103

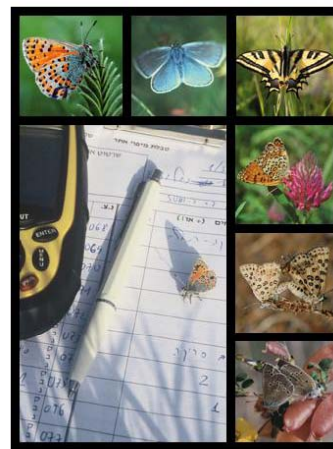
GETTING THE PUBLIC INVOLVED IN BUTTERFLY CONSERVATION: LESSONS LEARNED FROM A NEW MONITORING SCHEME IN GERMANY

ELISABETH KÜHN,^a REINART FELDMANN,^b ALEXANDER HARPKE,^a NORBERT HIRNEISEN,^c
MARTIN MUSCHE,^a PATRICK LEOPOLD,^d AND JOSEF SETTELE^a

Israel Journal of

Ecology & Evolution

Vol. 54, No. 1, 2008

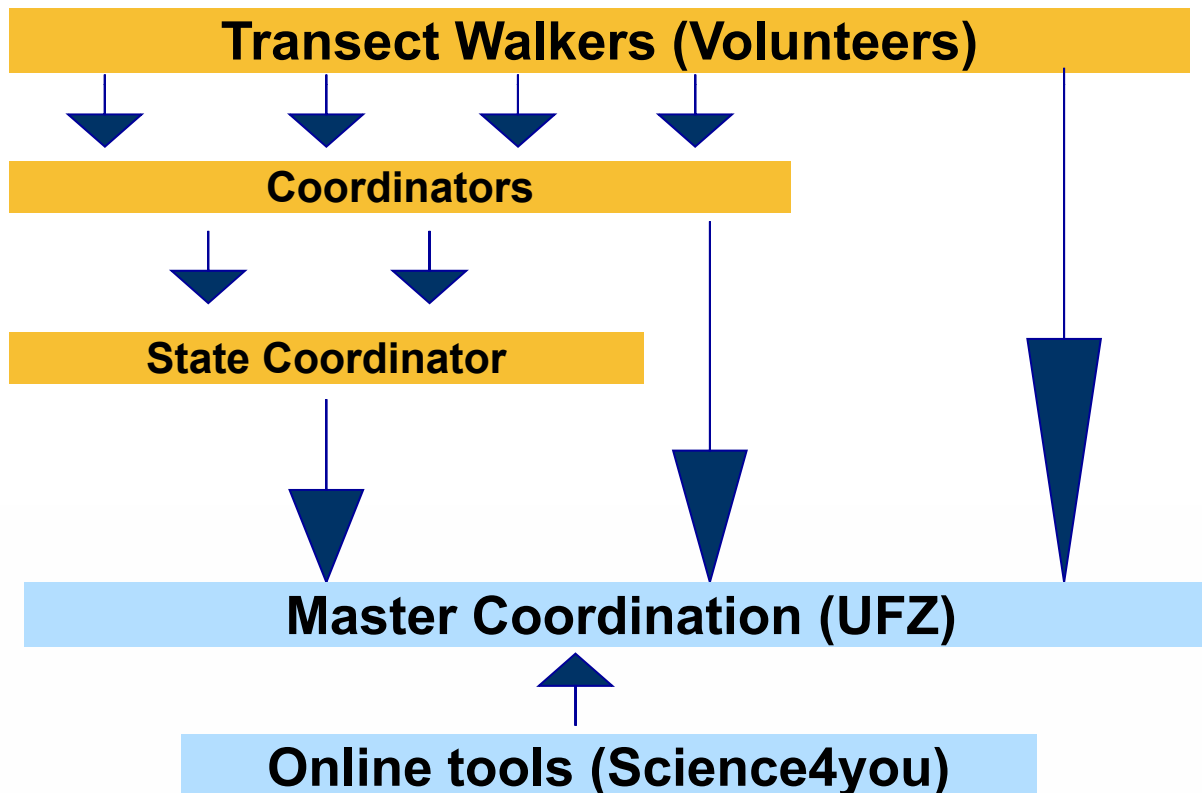


BUTTERFLY CONSERVATION IN THEORY AND PRACTICE

How does it work?

The German Experience

1. Establish local monitoring (2001 Butterfly Monitoring Northrhine-Westphalia)
2. One standard: length = 0.5-1.5 km, one habitat, weekly counts at good weaher
3. Simple, hierarchical organizational scheme



How does it work?

The German Experience

1. Establish local monitoring (2001 Butterfly Monitoring Northrhine-Westphalia)
2. One standard: length = 0.5-1.5 km, one habitat, weekly counts at good weaher
3. Simple, hierarchical organizational scheme
4. „Natural dillution“, no exclusion („everyone counts“). E.g. „Plus“ observations
5. Much work in terms of validation

100

E. KÜHN ET AL.

Isr. J. Ecol. Evol.

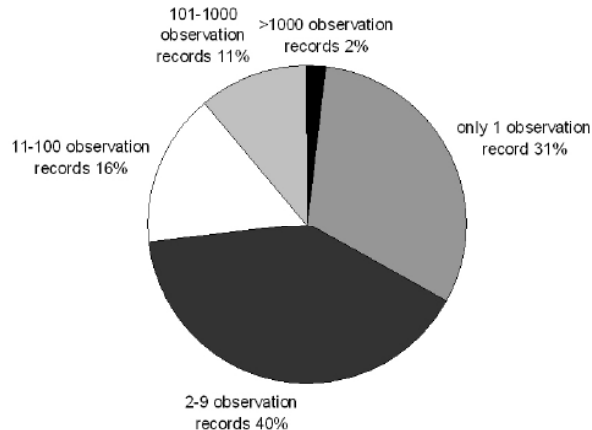
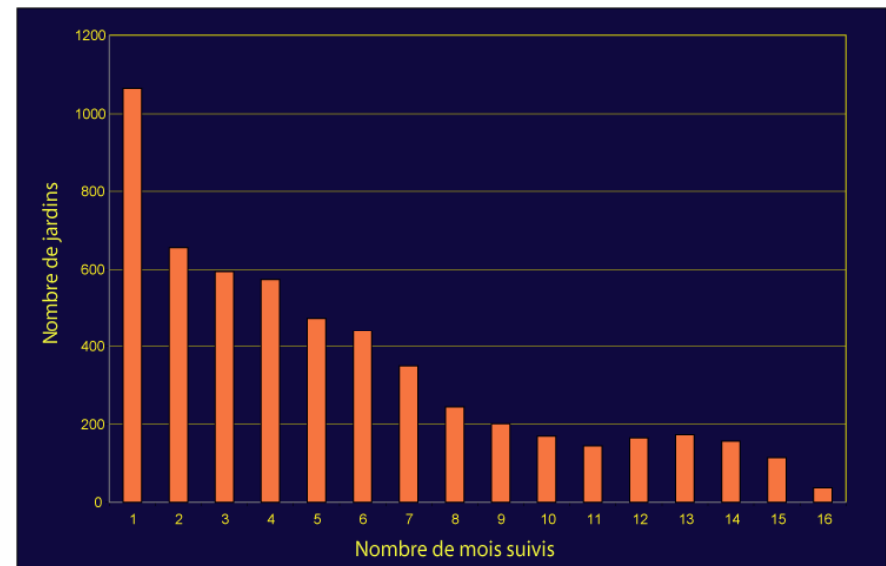


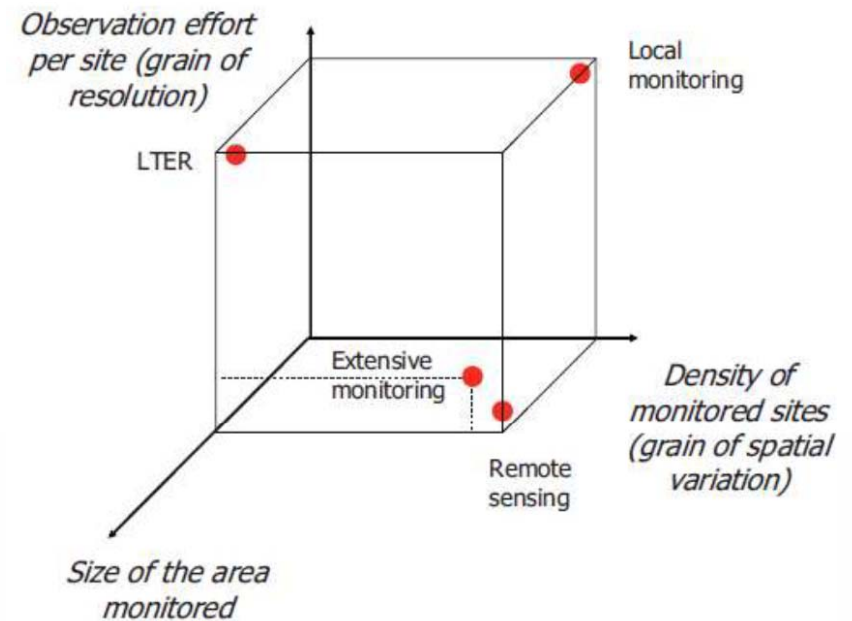
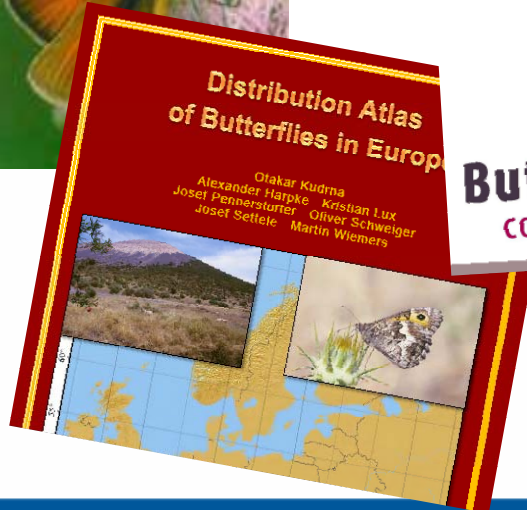
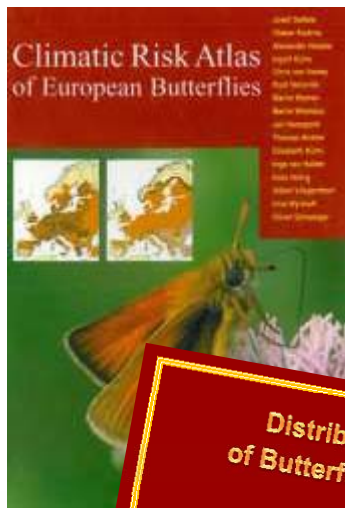
Fig. 5. User activity in Butterfly recording projects (incl. TMD); data collected for all projects hosted by *science4you*.



Number of month in the scheme

What does it give us?

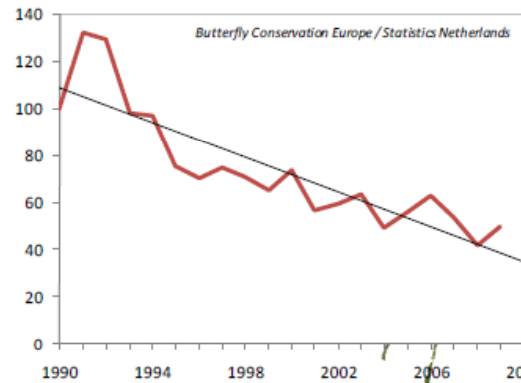
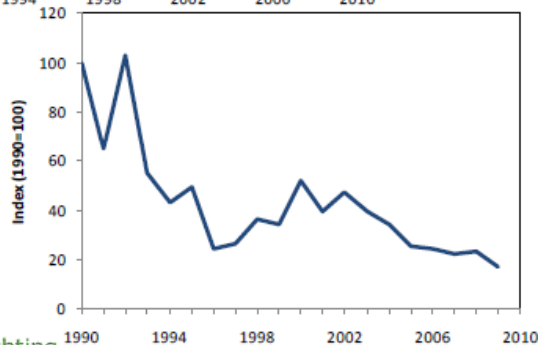
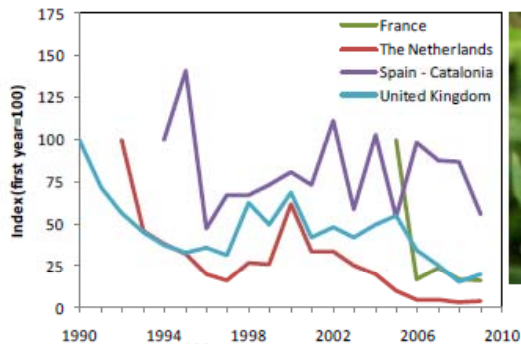
- High quality data, superb cost-effectiveness (voluntary-based)
- Capacity to (rapidly) identify trend and inform policy-makers etc.
- Support national and EU reporting demands
- Visibility, e.g. publications



What does it give us?

Capacity to integrate!

Grassland indicators:
important also for legal reporting demands (EU Habitat Directive)



van Swaay et al. 2010a

What does it give us?

Capacity to integrate!

Climatic Risk Atlas



Results 3: increases

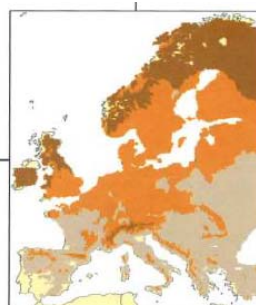
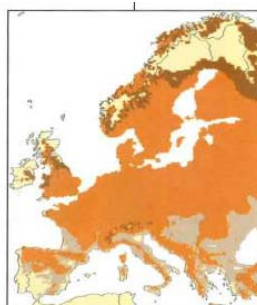
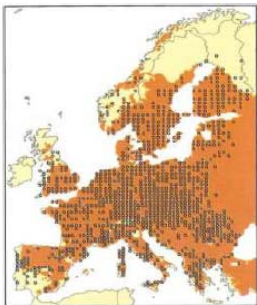
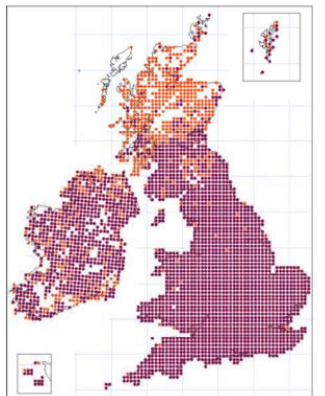


Aglais io

population trend **-24%**
distribution trend **17%**



● 1995-1999
● New squares 2005-2009

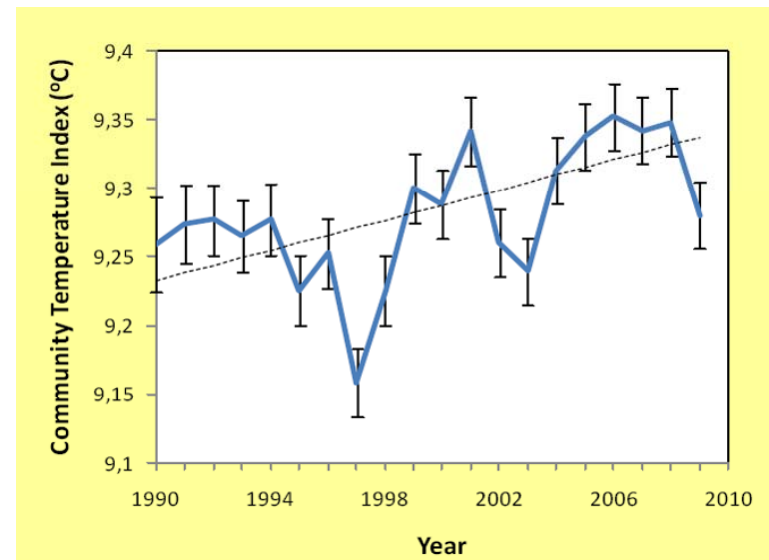


GRAS
(A1FI)

2050

2080

Climate change indicator



Based on 4000 (!) transects:

Species moved 75km north

But the climate shifted 249km!

van Swaay et al. 2010b

Beyond BMS

1. Other sampling efforts / frequencies

- Some schemes are based on professionals. Example Switzerland:

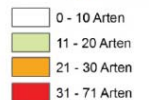
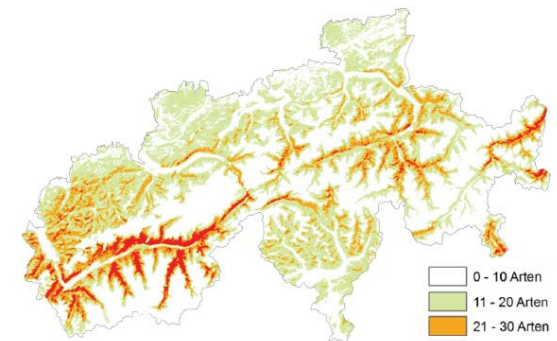
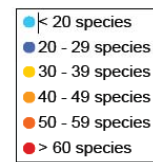
Butterfly programme 2003 - 2011

- systematic random sampling
- 520 sampling squares of 1km²
- 2.5 km-transects
- 7 surveys per year (4 in alpine transects)
- Counts back and forth
- Species richness
- Team of contractors

Results 2006-2010: Species richness



Minimum: 2 species (alpine)
Maximum: 79 species (Valais)



Beyond BMS

1. Other sampling efforts / frequencies

- Some schemes are based on professionals
- Other schemes differ in frequency or length.

Examples:

France	560 transects	3-5 times/yr
UK	800 transects	2-3 times/yr
Germany Pfalz	80 transects	1 time/yr

Beyond BMS

2. Other protocols

- Protocols for **rare species** – per species, per country and demands



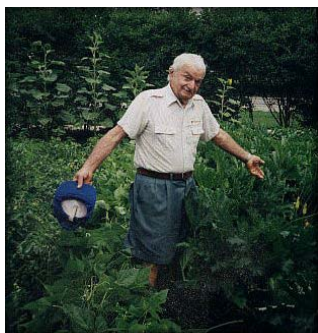
**Important element:
„Zero“ observations!**

Beyond BMS

2. Other protocols

- Protocols for **rare species** – per species, per country and demands
- Citizen-science: Example **French Garden Biodiversity Observatory**

Observatoire des PAPILLONS Jardins



Composition du jardin : vos pratiques au jardin

Agencement du jardin

- Parterre et arbustes fleuris
- Haies (sauf thuyas ou laurier cerise)
- Verger, arbres fruitiers
- Espaces non entretenus (friches, espaces naturels)
- Potager
- Bassin, mare
- Pelouse tondue
- Espaces pavés, gravillonnés

Les plantes du jardin :

- Buddleia (arbre à papillons)
- Centaurées et scabieuses (bleuets)
- Valériane, Centranthe rouge
- Géraniums et pélargoniums
- Lavande
- Crucifères (choux, cardamine, giro)
- Orties
- Ronces
- Lierre
- Trèfles, lotiers et luzernes
- Plantes aromatiques (thym, romar)



Beyond BMS

2. Other protocols

- Protocols for **rare species** – per species, per country and demands
- Citizen-science: Example **French Garden Biodiversity Observatory**
Established 2005, launched 2006: immediate success!

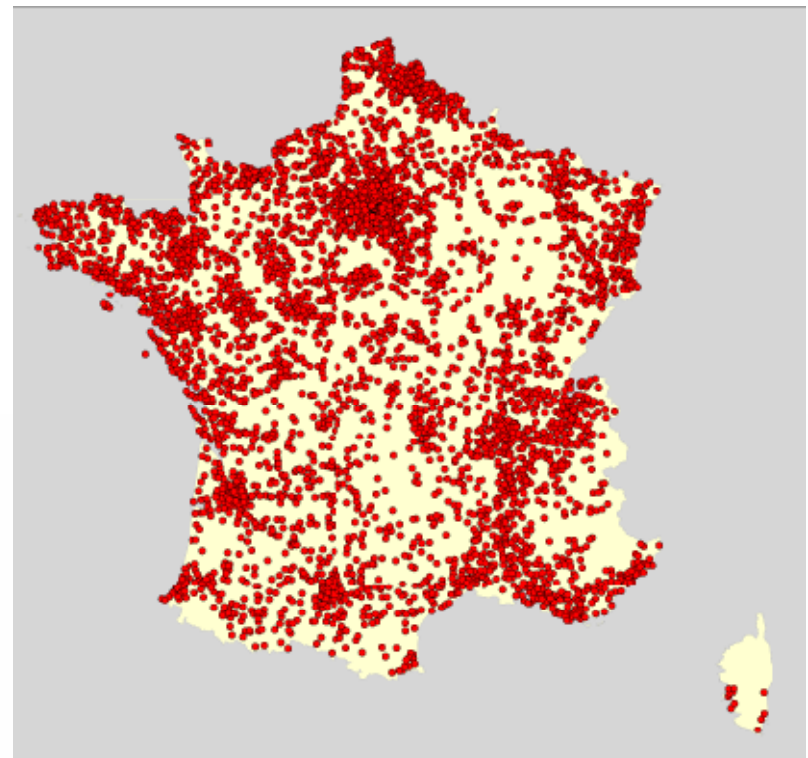
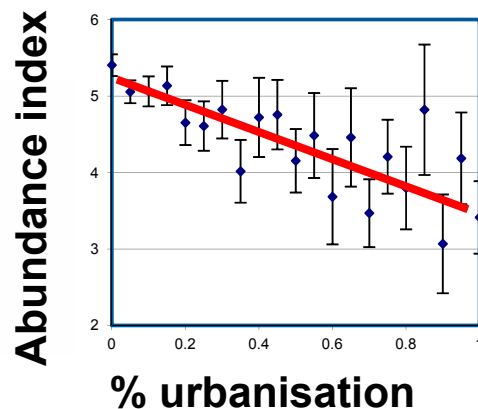
19,695 registered people

≈ 4000 gardens visited

≈ 16,000 counts

≈ 200,000 butterflies/yr ($\Sigma 2$ mio)

First results already available



Beyond BMS

2. Other protocols

- Protocols for **rare species** – per species, per country and demands
- Citizen-science: Example **French Garden Biodiversity Observatory**
Established 2005, launched 2006: immediate success!

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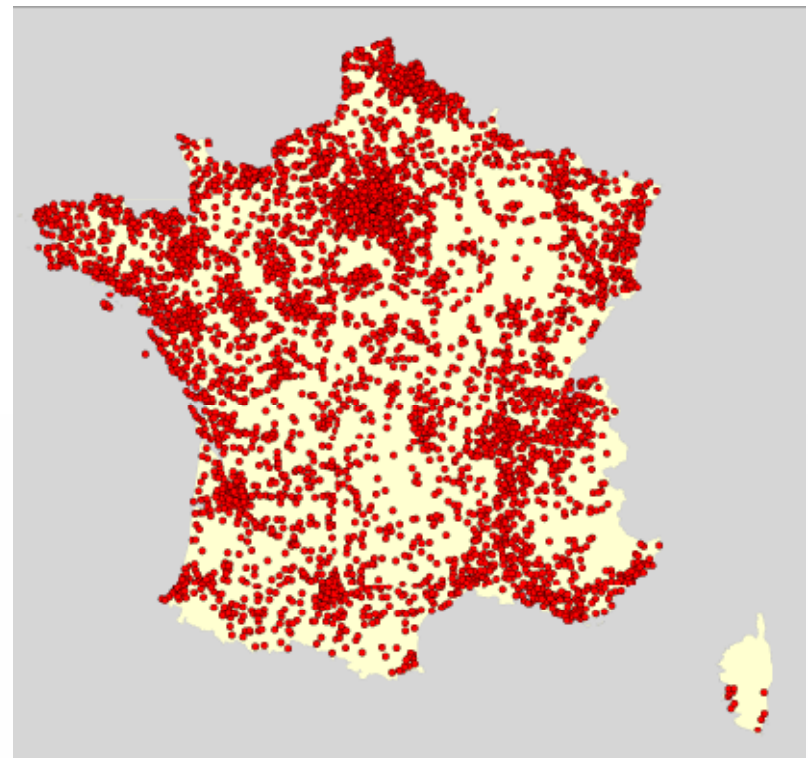
≈ 16,000 counts

≈ 200,000 butterflies/yr (Σ 2 mio)

First results already available

Motivation of citizens:

- **Contribution to science**
- **Self learning** (65% of observers have reduced use of pesticides!)



Beyond BMS

3. Opportunistic observations

- Most schemes in Europe include interfaces to collect opportunistic data
- Smart user interfaces force „hidden“ standards
- Pictures as important means for validation

The screenshot shows the 'science4you Tagfalter-Monitoring-Deutsches Land Datenzentrale' website. The main content area displays a grid of butterfly observations. The top navigation bar includes 'Überblick', 'Ergebnisse', 'Arten', 'Regionales', 'Melden', 'Forum', 'Info', 'Links', 'Hilfe', 'Koordinator:innen', and 'Administration'. The main content area is titled 'Die aktuellste Transaktmeldung' and shows a list of observations with columns for ID, Name, Date, and Photo. The right sidebar features logos for QBUND, NABU, and Butterfly Conservation Europe.

Challenges

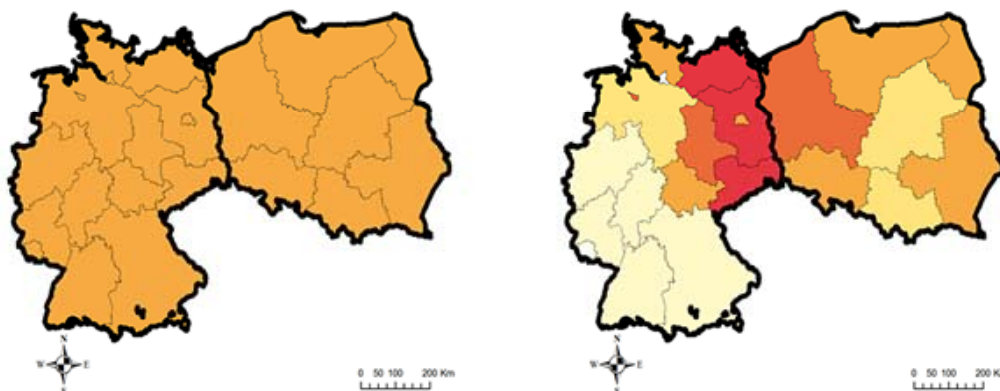
- Can we integrate data across scales?
- Can we integrate data from different origins, especially standard versus opportunistic data?
- Can we use this information to identify drivers of change?

Challenges

- Can we integrate data across scales?
- Can we integrate data from different origins, especially standard versus opportunistic data?
- Can we use this information to identify drivers of change?

A1: scale-specificity of drivers can be used to identify spatial signatures
(Tzanopolous et al. Submitted)

Figure 4: an example of the clear spatial signature of agricultural intensification: analysis of the drivers at too large a scale (national left) results in the disappearance of the local signal (right).
Figure from: Tzanopolous et al. in prep.

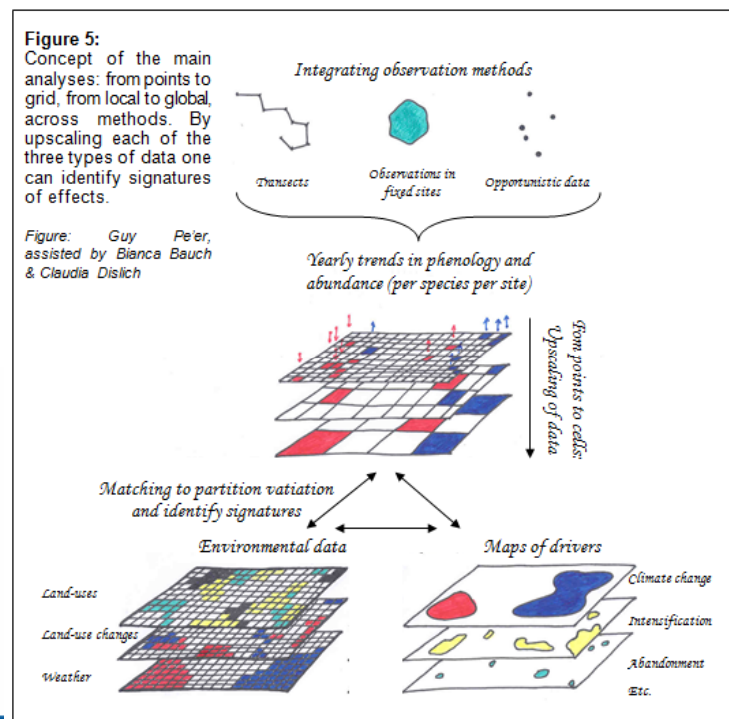


Challenges

- Can we integrate data across scales?
- Can we integrate data from different origins, especially standard versus opportunistic data?
- Can we use this information to identify drivers of change?

A2: hierarchical- and occupancy models can help

A3: willingness to cooperate may help too



Prospects: efforts for integration

EU Funded projects:

- *EuMon* (2004-2007, lead UFZ, € 2.2 Mio)
- *EBONE* (2008-2012, € 3.4 Mio)
- *EU-BON* (in negotiations, € 8 Mio)

Example of outcomes:

BiMAT

The EuMon integrated Biodiversity Monitoring & Assessment Tool

Overview of monitoring approaches and organizations in Europe

DaEuMon: Database covering 327 schemes, 264 (80.73%) voluntary-based

The screenshot displays the BiMAT web interface. At the top, it reads 'BiMAT The EuMon Integrated Biodiversity Monitoring & Assessment Tool'. Below this, there is a navigation bar with 'BiMAT' and 'Home', 'Monitoring schemes', 'Monitoring in general', and 'Search'. The main content area is titled 'Assessing the coverage of species and habitat monitoring schemes in Europe'. It features a search form with the following fields and options:

- Search the database:** A search input field.
- Numbering schemes available:** Species (156) / Habitats (177).
- Species #/Habitat scheme:** A dropdown menu.
- Species, genus, or higher level:** A text input field.
- Habitat species group was monitored:** A dropdown menu.
- Habitat name:** A text input field.
- Habitat group was monitored:** A dropdown menu.
- Monitoring scheme:** A dropdown menu.
- Program name:** A dropdown menu.
- Volume name:** A dropdown menu.

There are also checkboxes for 'Species' and 'Habitats' at the top right of the search section. At the bottom left, there is a checkbox for 'Advanced search'.

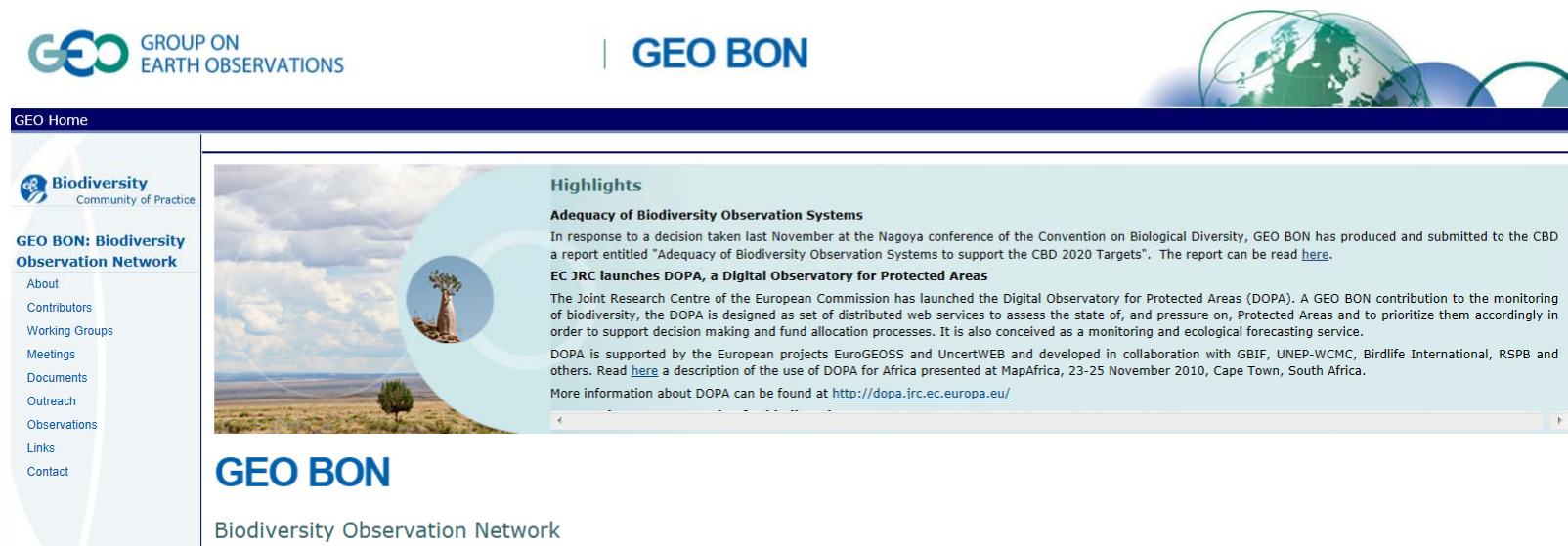
Prospects: efforts for integration

GEO BON: Group on Earth Observations Biodiversity Observation Network

Launched Feb 2008

≈ 100 organizations collaborating

to improve terrestrial, freshwater & marine biodiversity observations globally and make their biodiversity data, information and forecasts more readily accessible



GEO GROUP ON EARTH OBSERVATIONS

GEO BON

GEO Home

Biodiversity
Community of Practice

GEO BON: Biodiversity Observation Network

- About
- Contributors
- Working Groups
- Meetings
- Documents
- Outreach
- Observations
- Links
- Contact

Highlights

Adequacy of Biodiversity Observation Systems

In response to a decision taken last November at the Nagoya conference of the Convention on Biological Diversity, GEO BON has produced and submitted to the CBD a report entitled "Adequacy of Biodiversity Observation Systems to support the CBD 2020 Targets". The report can be read [here](#).

EC JRC launches DOPA, a Digital Observatory for Protected Areas

The Joint Research Centre of the European Commission has launched the Digital Observatory for Protected Areas (DOPA). A GEO BON contribution to the monitoring of biodiversity, the DOPA is designed as set of distributed web services to assess the state of, and pressure on, Protected Areas and to prioritize them accordingly in order to support decision making and fund allocation processes. It is also conceived as a monitoring and ecological forecasting service.

DOPA is supported by the European projects EuroGEOSS and UncertWEB and developed in collaboration with GBIF, UNEP-WCMC, Birdlife International, RSPB and others. Read [here](#) a description of the use of DOPA for Africa presented at MapAfrica, 23-25 November 2010, Cape Town, South Africa.

More information about DOPA can be found at <http://dopa.jrc.ec.europa.eu/>

GEO BON
Biodiversity Observation Network

Prospects: efforts for integration

GBIF: Global Biodiversity Information Facility

An international organization that is working to make the world's biodiversity data accessible everywhere in the world.

Currently 321,064,406 data records (277,629,428 with coordinates) shared via the GBIF network.

The screenshot shows the GBIF Data Portal homepage. At the top left is the GBIF logo with the text 'GLOBAL BIODIVERSITY INFORMATION FACILITY'. To the right are navigation links: 'SPECIES COUNTRIES DATASETS OCCURRENCES SETTINGS ABOUT'. Below this is a blue banner with a world map and the text '... free and open access to biodiversity data'. On the left is a search bar with a magnifying glass icon and the text 'Search species/country/dataset'. On the right is a 'Welcome to the GBIF Data Portal' section with the text: 'Access 321,064,406 data records (277,629,428 with coordinates) shared via the GBIF network. To learn how to use this site, please see [About](#). To tune this site for smaller displays, see [Settings](#). Version 1.3.2 - click here to see what is new!'. Below the search bar are three main sections: 'Explore Species' (purple), 'Explore Countries' (orange), and 'Explore Datasets' (blue). Each section includes a brief description and a 'Species', 'Countries', or 'Datasets' sub-section with more detailed information.

GLOBAL BIODIVERSITY INFORMATION FACILITY

SPECIES COUNTRIES DATASETS OCCURRENCES SETTINGS ABOUT

... free and open access to biodiversity data

Search species/country/dataset Search

Welcome to the GBIF Data Portal
Access 321,064,406 data records (277,629,428 with coordinates) shared via the GBIF network.
To learn how to use this site, please see [About](#).
To tune this site for smaller displays, see [Settings](#).
Version 1.3.2 - click here to see what is new!

Explore Species
Find data for a species or other group of organisms.
Species
Information on species and other groups of plants, animals, fungi and micro-organisms, including species occurrence records, as well as classifications and scientific and common names.

Explore Countries
Find data on the species recorded in a particular country, territory or island.
Countries
Information on the species recorded in each country, including records shared by publishers from throughout the GBIF network.

Explore Datasets
Find data from a data publisher, dataset or data network.
Datasets
Information on the data publishers, datasets and data networks that share data through GBIF, including summary information on 8842 datasets from 379 data publishers.

Thank you for your attention!

Material used from:

Elisabeth Kühn: Germany

Chris van Swaay: The Netherlands

Petra Ramseier: Switzerland

Romain Julliard: France

Further presentations available at the website of the conference
„Future of Butterflies in Europe III“ (March 2012)

www.futureofbutterflies.nl



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