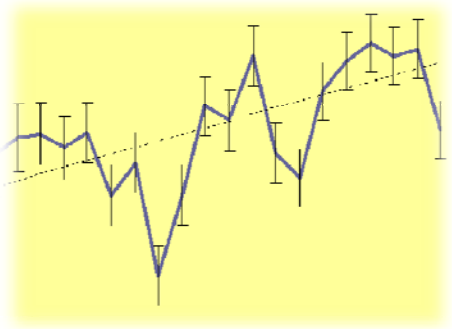
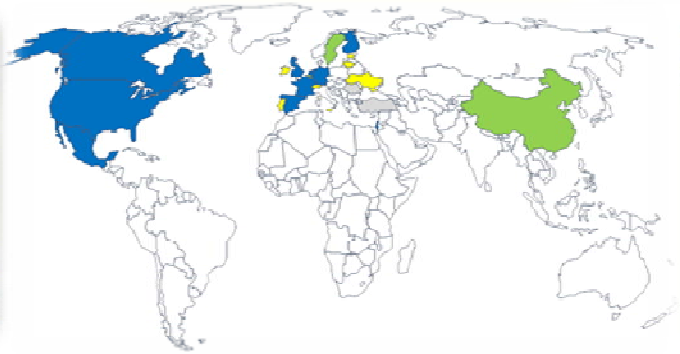
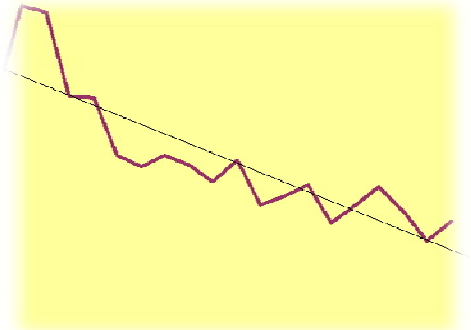
Butterfly Monitoring Schemes:
Expansion through 35 years







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

Butterfly monitoring workshop, May 2012

אגודת חובבי הפרפרים בישראל
Lepidopterists' Society of Israel

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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

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Where it all started

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

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Where it all started

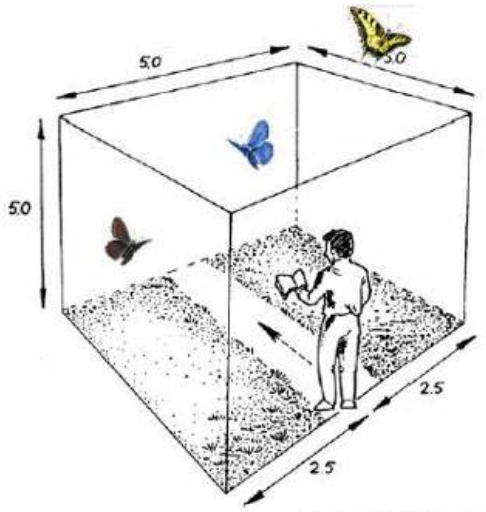
UK: systematic monitoring since 1976,
“Pollard walk” established (Pollard 1977)

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



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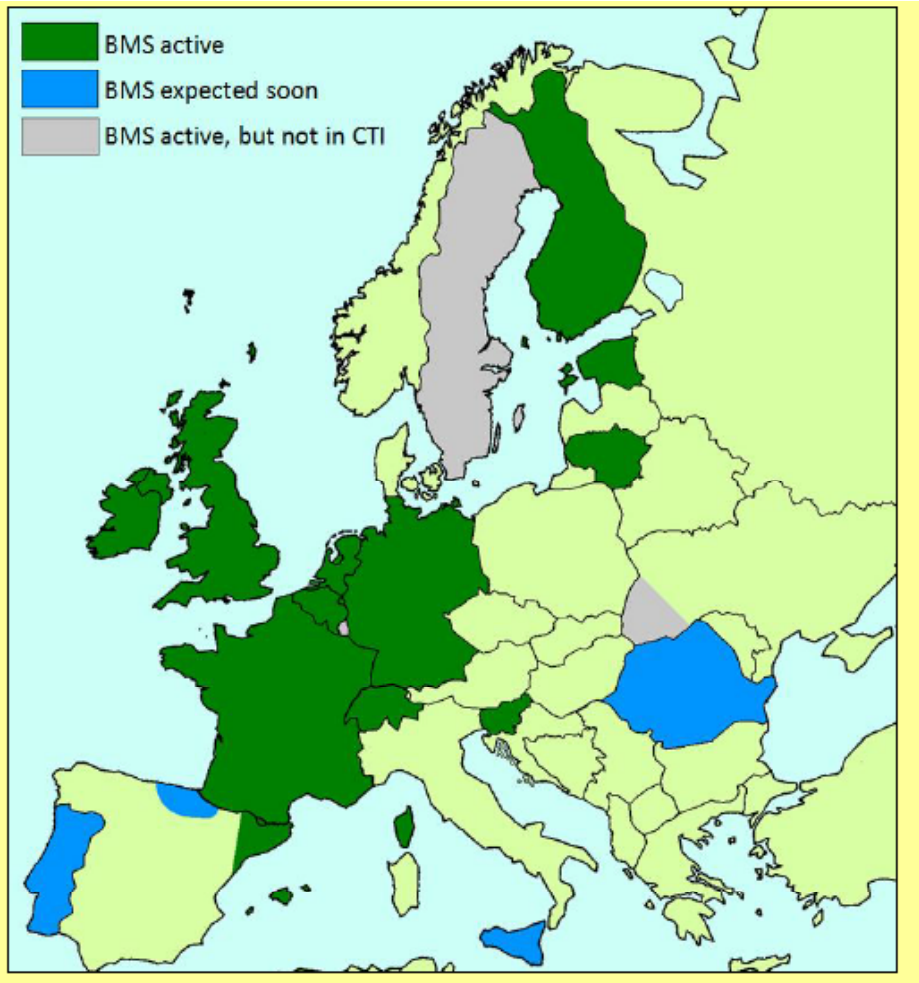
Expansion through Europe and beyond

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...



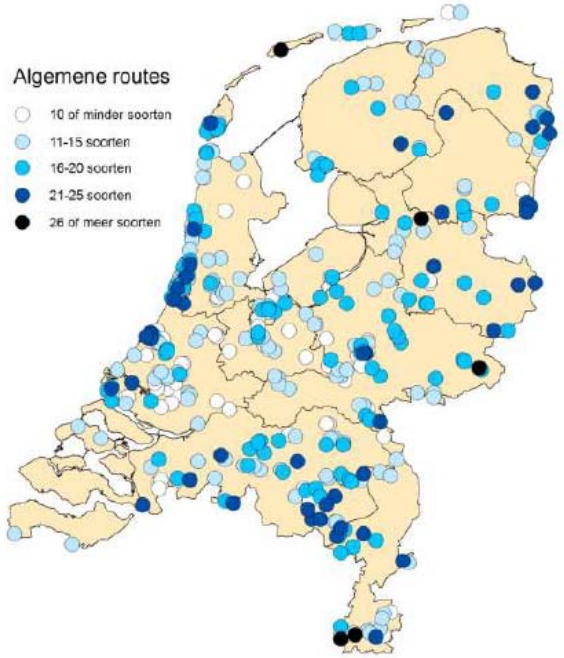
Country	Intensive	Established	Sites	Samples / yr
United Kingdom		1976	1200	15-26
The Netherlands		1990	430/ 950	15-20
Ukraine - Carpathians	Proff.	1990	158	2-10
Belgium		1991	98	1-26
Spain (Catalonia, Andorra)		1994	115	30
Portugal		1998-2006	0	3-5
Finland	30% Prof.	1999	70	8-10
Germany (Nordhein Westfalen)		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

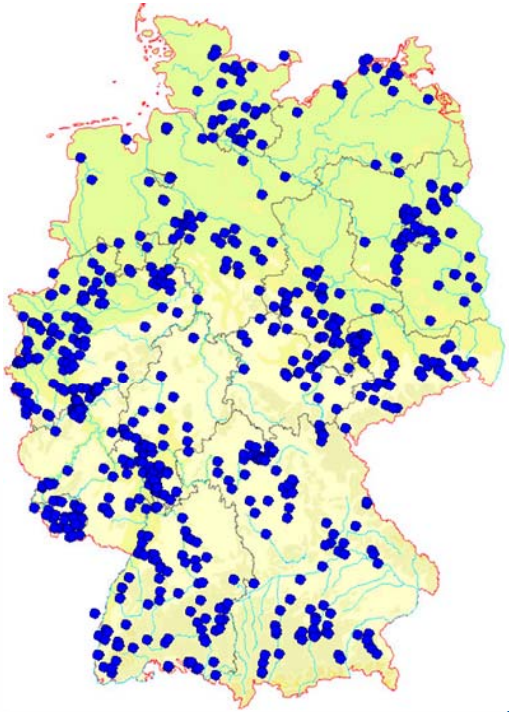
Currently in Europe:

- > 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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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

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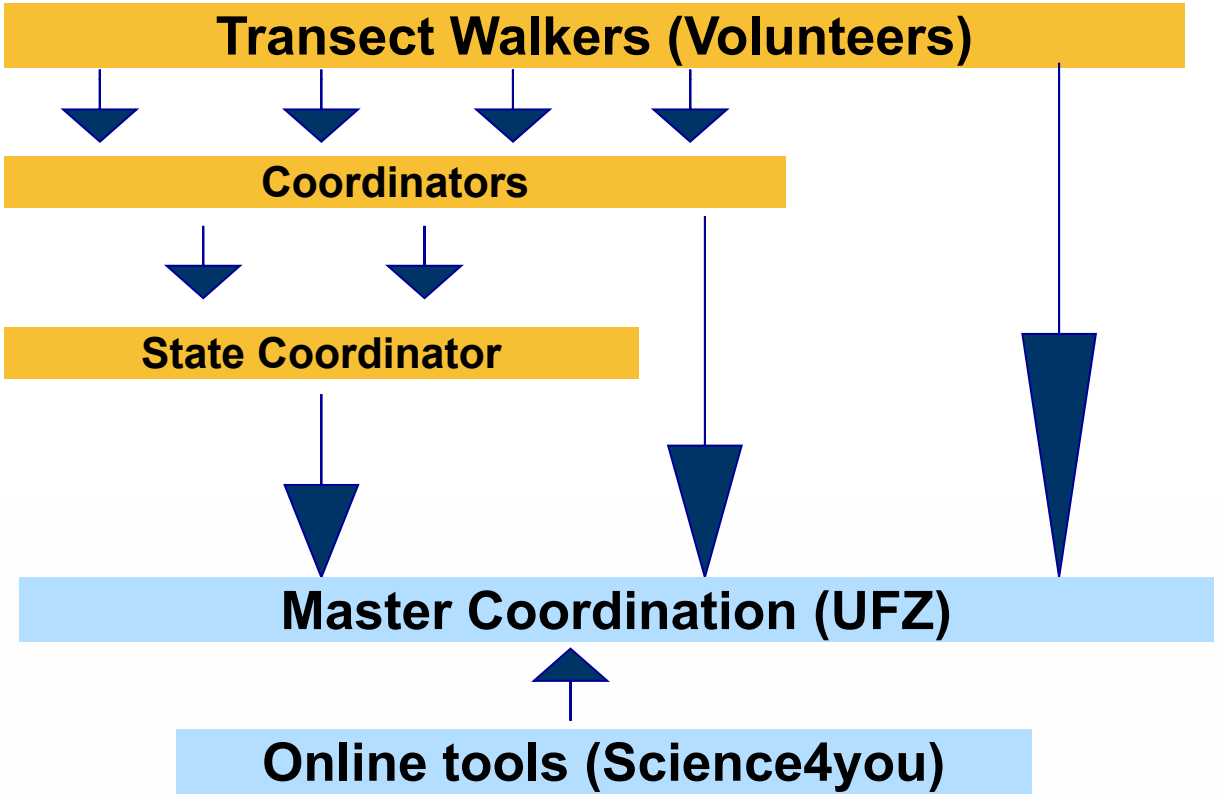
How does it work?
The German Experience

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



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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

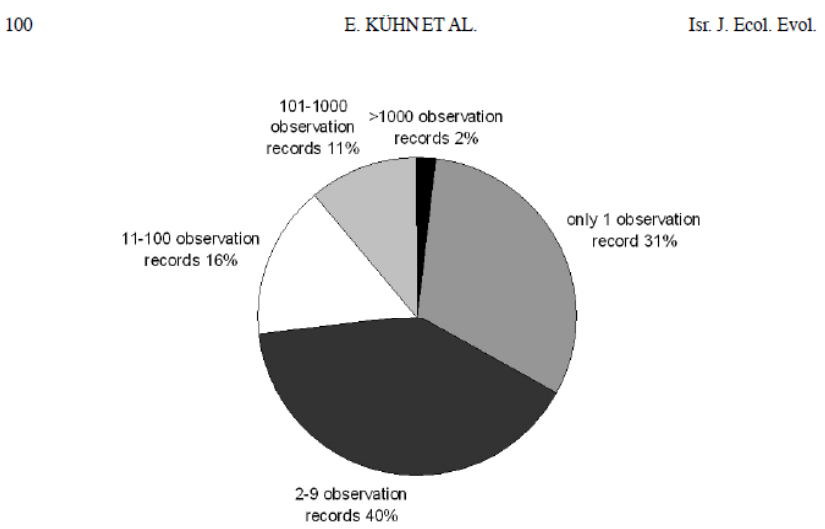
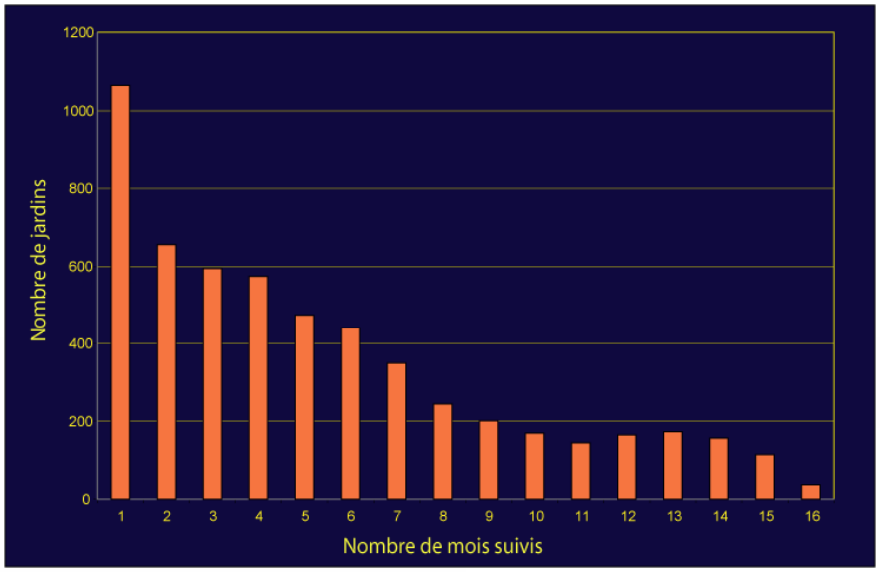


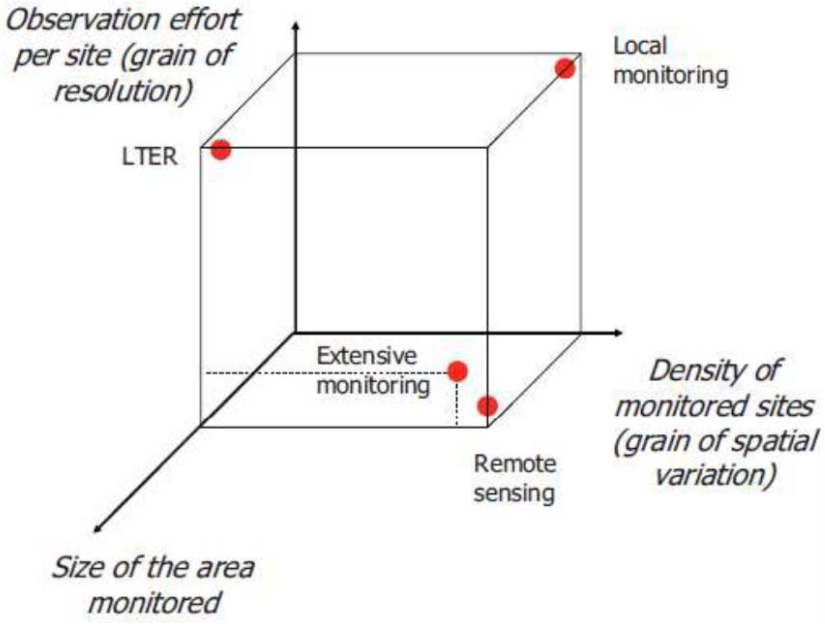
Fig. 5. User activity in Butterfly recording projects (incl. TMD); data collected for all projects hosted by *science4you*.



Number of month in the scheme

What does it give us?

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



ichting

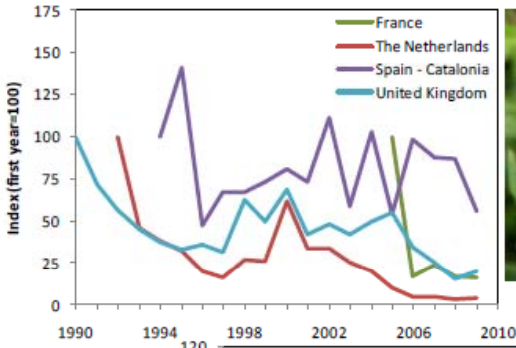
D. Couvet et al. / C. R. Biologies 334 (2011) 370–377

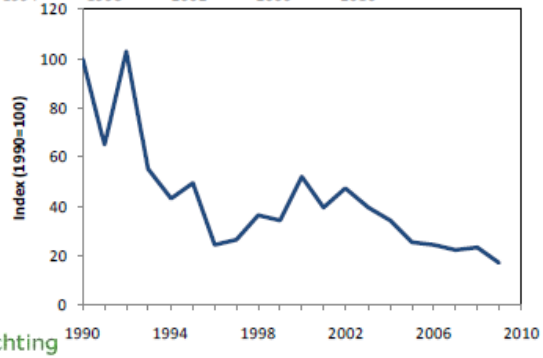
What does it give us?

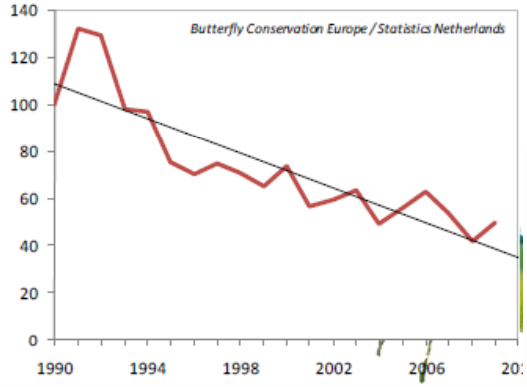
Capacity to integrate!

Grassland indicators:

important also for legal reporting demands (EU Habitat Directive)





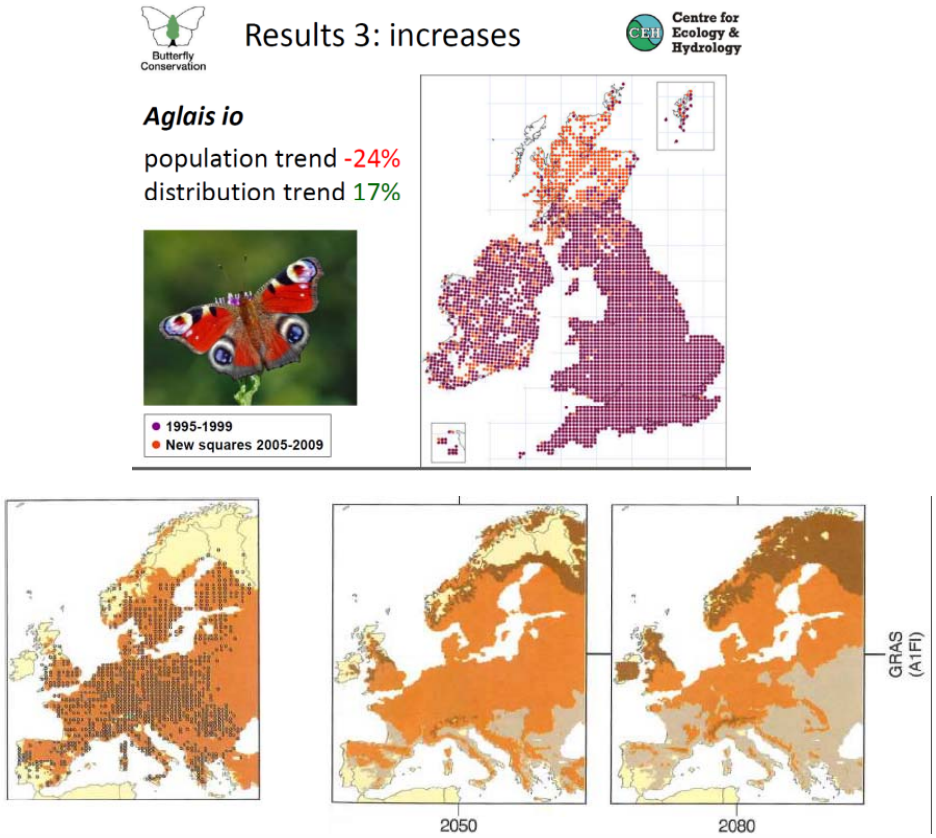


van Swaay et al. 2010a

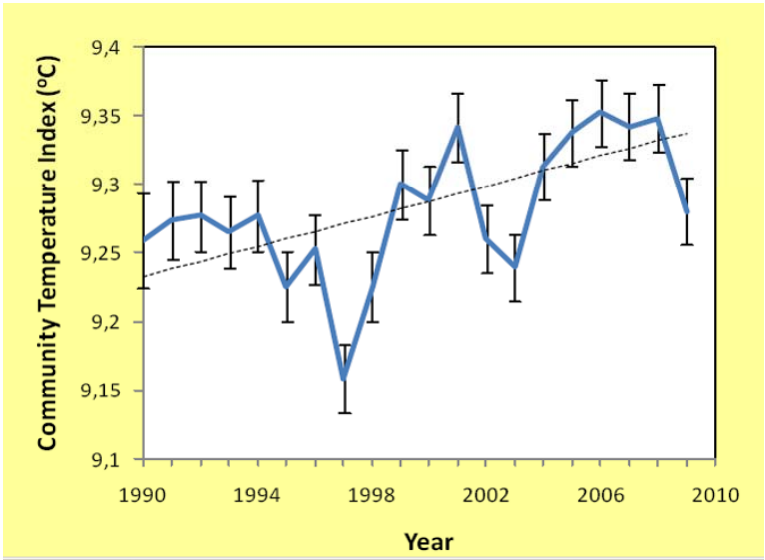
What does it give us?

Capacity to integrate!

Climatic Risk Atlas



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 / frquencies

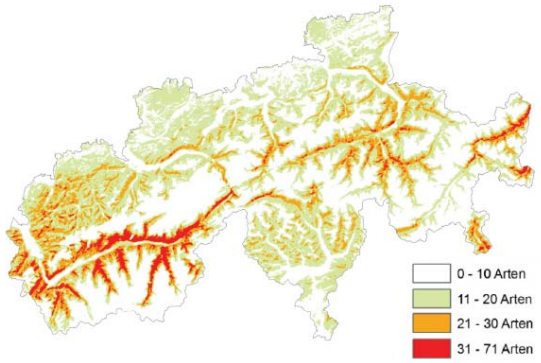
- Some schemes are based on professionals. Example Switzerland:

Butterfly programme 2003 - 2011

- systematic random sampling
- 520 sampling squares of 1km^2
- 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 / frquencies

- 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

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Beyond BMS

2. Other protocols

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

Important element:
„Zero“ observations!

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Beyond BMS

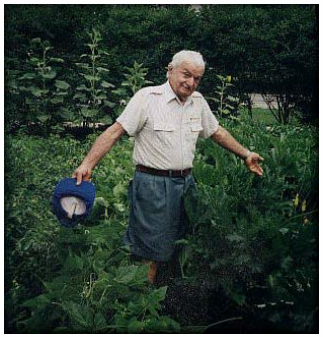
2. Other protocols

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

Observatoire des PAPILLONS des Jardins

MUSEUM NATIONAL D'HISTOIRE NATURELLE

Noé Conservation



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!

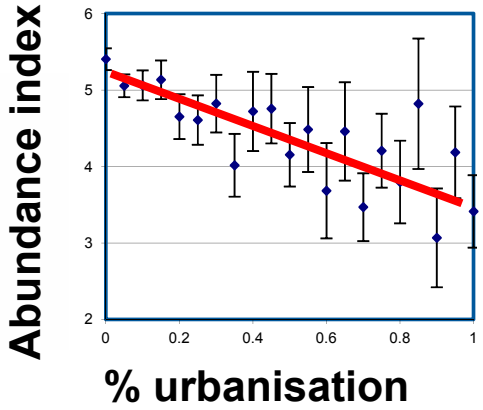
19,695 registered people

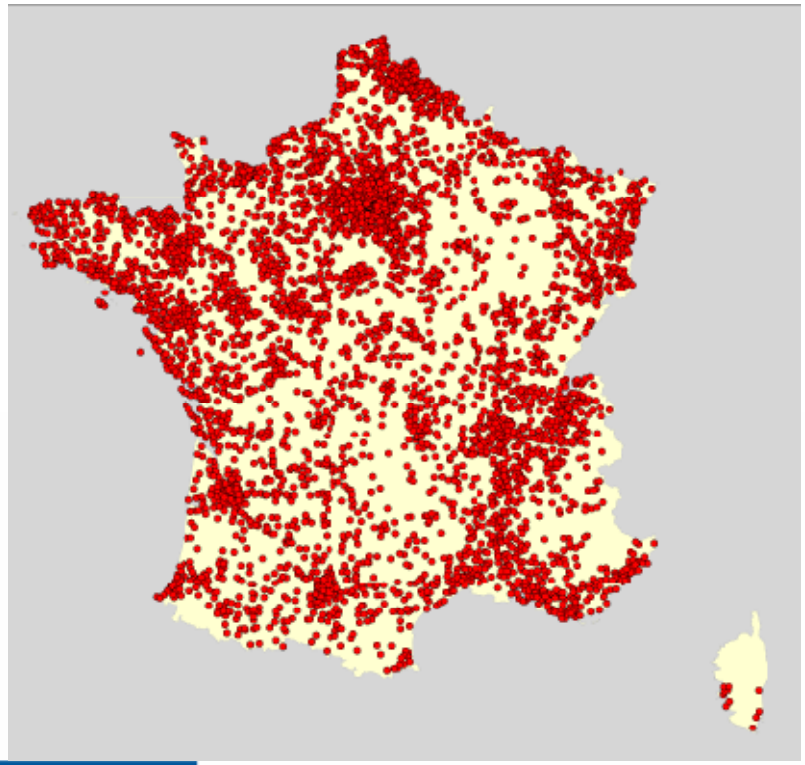
≈ 4000 gardens visited

≈ 16,000 counts

≈ 200,000 butterflies/yr (Σ2 mio)

First results already available





Beyond BMS

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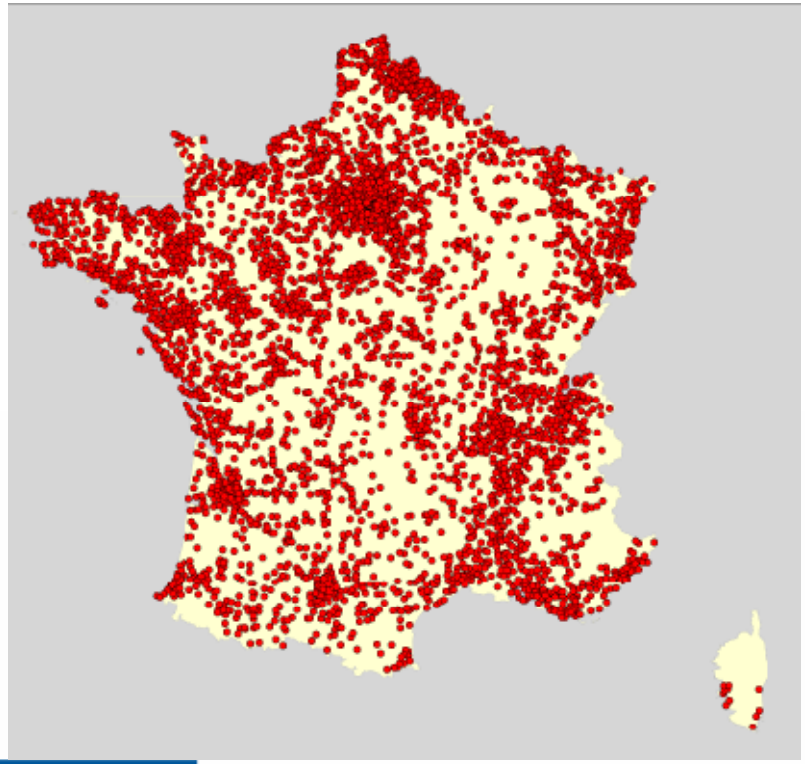


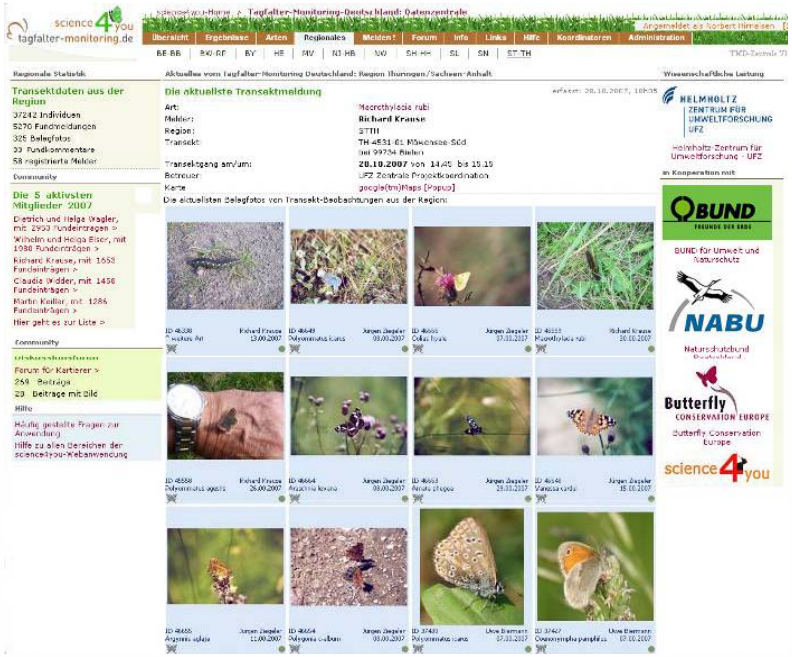
Motivation of citizens:

- **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**



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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?

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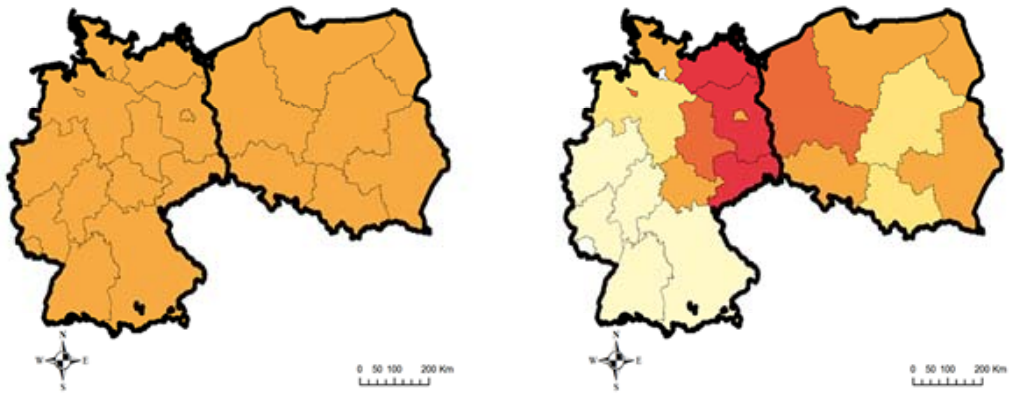
- Can we integrate data from different origins, especially standard versus opportunistic data?
- Can we use this information to identify drivers of change?

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.*



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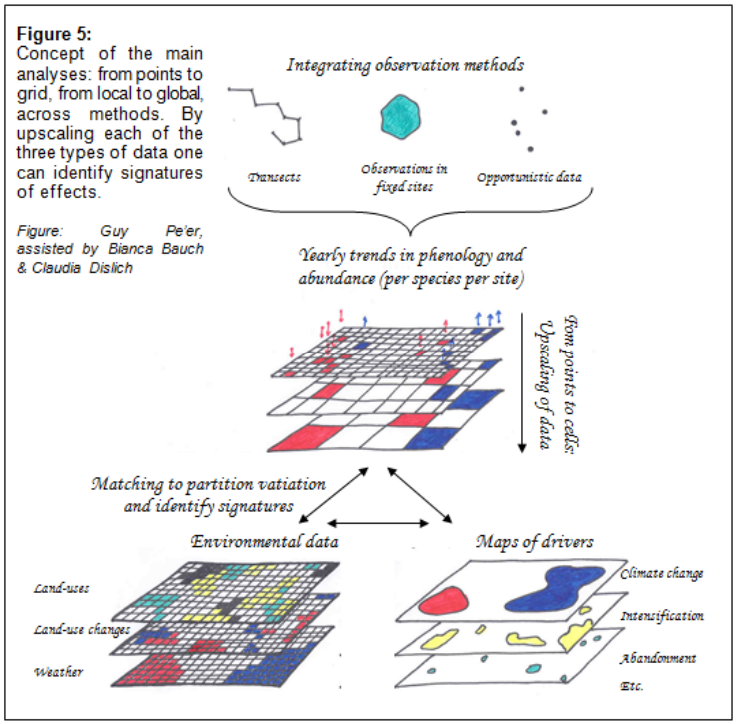
Challenges

- 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

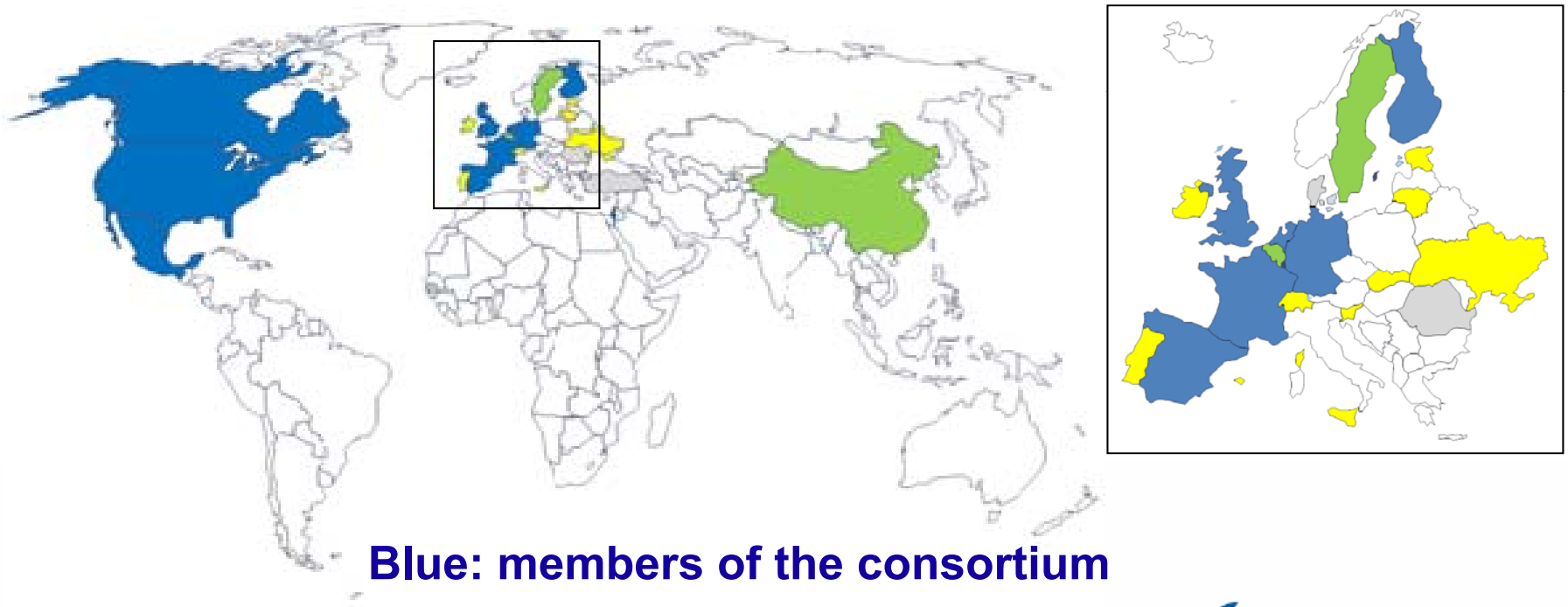
A3: willingness to cooperate may help too



Prospects: efforts for integration

LOLA-BMS: How Local-scale processes build up the Large-scale response of Butterflies to global changes: Integrative analysis across Monitoring Schemes

proposal pending, € 200,000



Blue: members of the consortium

Green: willing to share data

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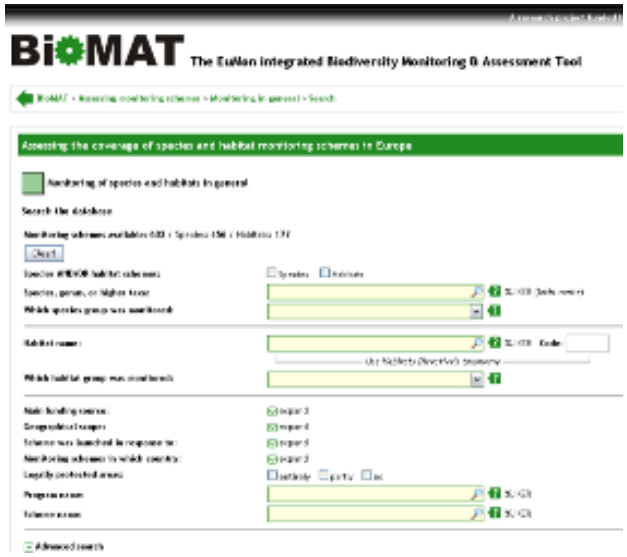
Prospects: efforts for integration

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:

BiOMAT

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

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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

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.

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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