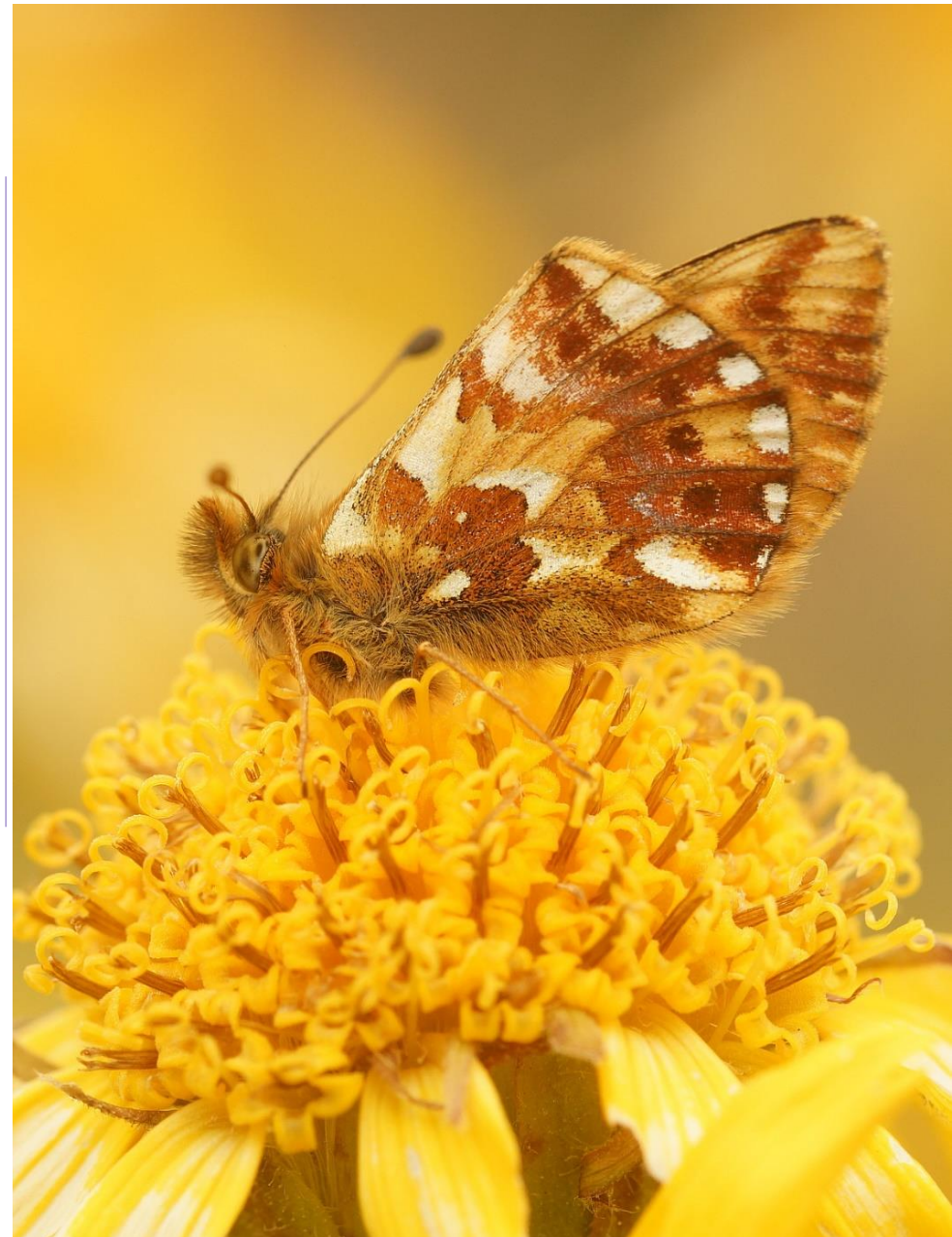
Summary of tools and data products produced under ABLE

BMS coordinators meeting, 28 October 2020

David Roy & Reto Schmucki

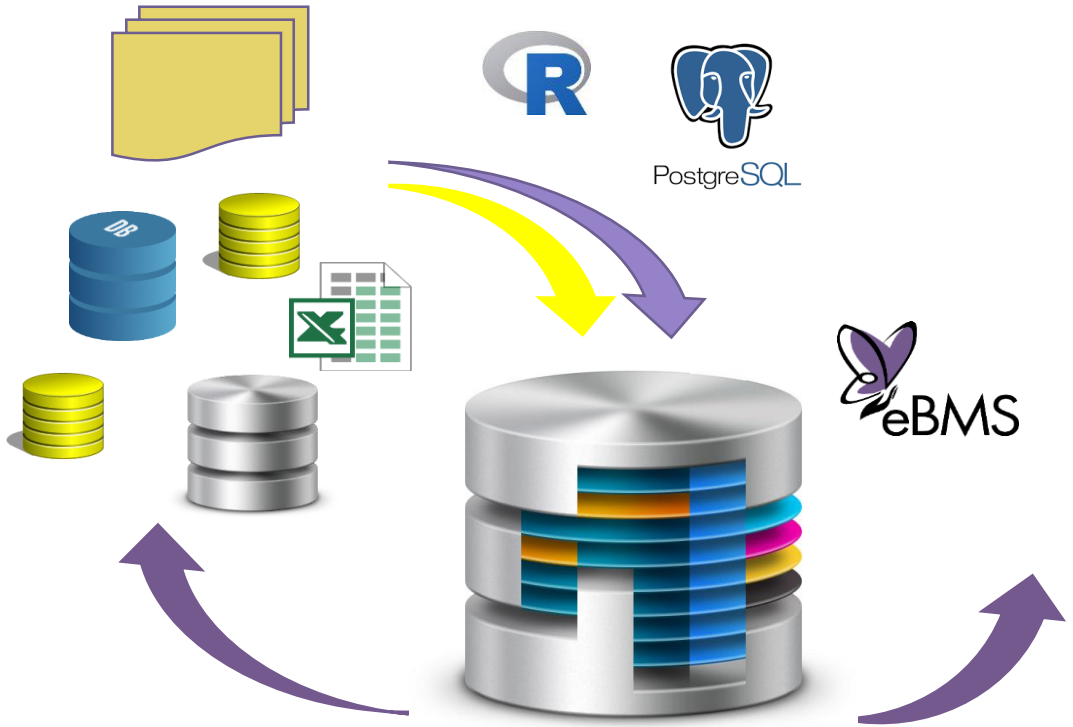
Contents

- Introduction
- ABLE Tools
  - eBMS database
  - eBMS online website
  - ButterflyCount App
  - rbms (R package)
- Next steps



The eBMS concept

- Comprehensive standardised data model
- Light and flexible for future development
- Easy to manage with open-access tools
- Respect and acknowledge data owners
- Benefit National BMS and the wider community

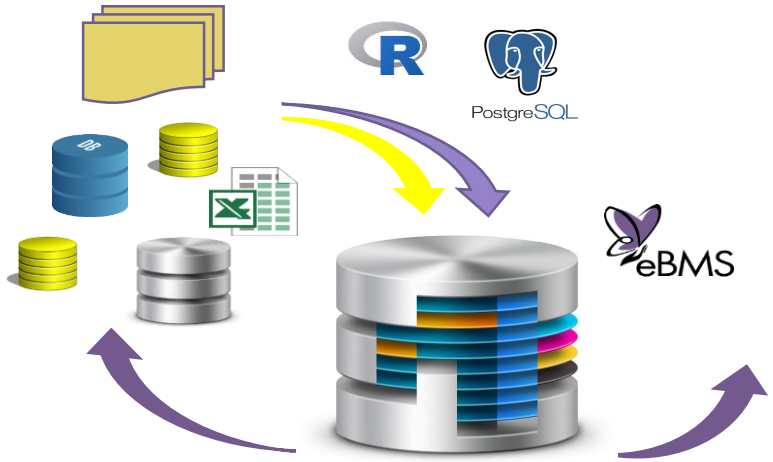


Versioning (eBMS v3.2)

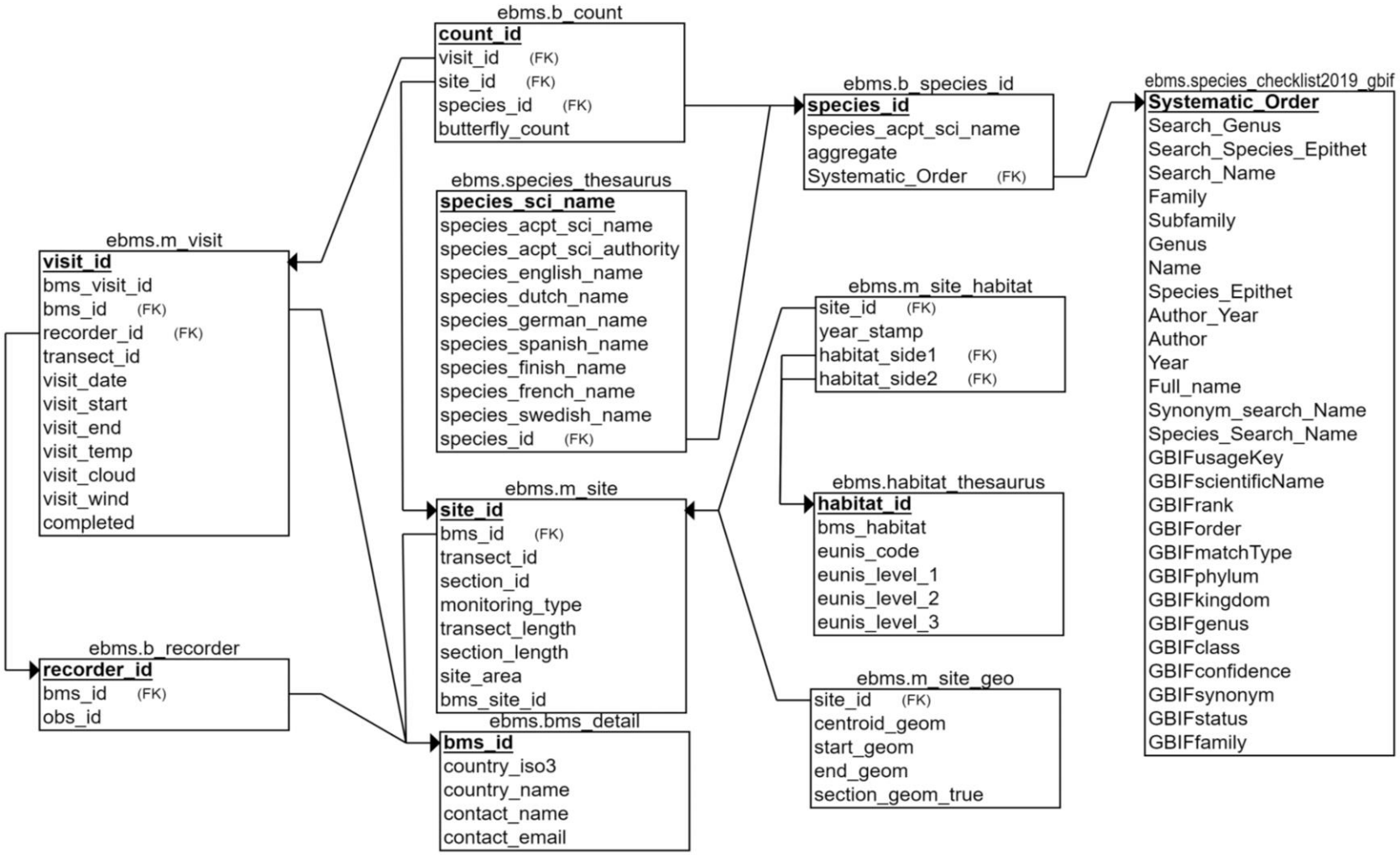
SQL Backup in UKCEH, BC Europe and UFZ

The eBMS in Number (1990 – 2018)

- **5,086,884 counts**
- **913,821 visits**
  - 5,239 in 1990
  - 66,267 in 2018
- **10,816 transects**
  - 266 in 1990
  - 4,816 in 2018
- **17,333 km of transect ***
  - 527 km in 1990
  - 7,673 km in 2018
- **312 species monitored**
- **25 schemes across 22 Countries**

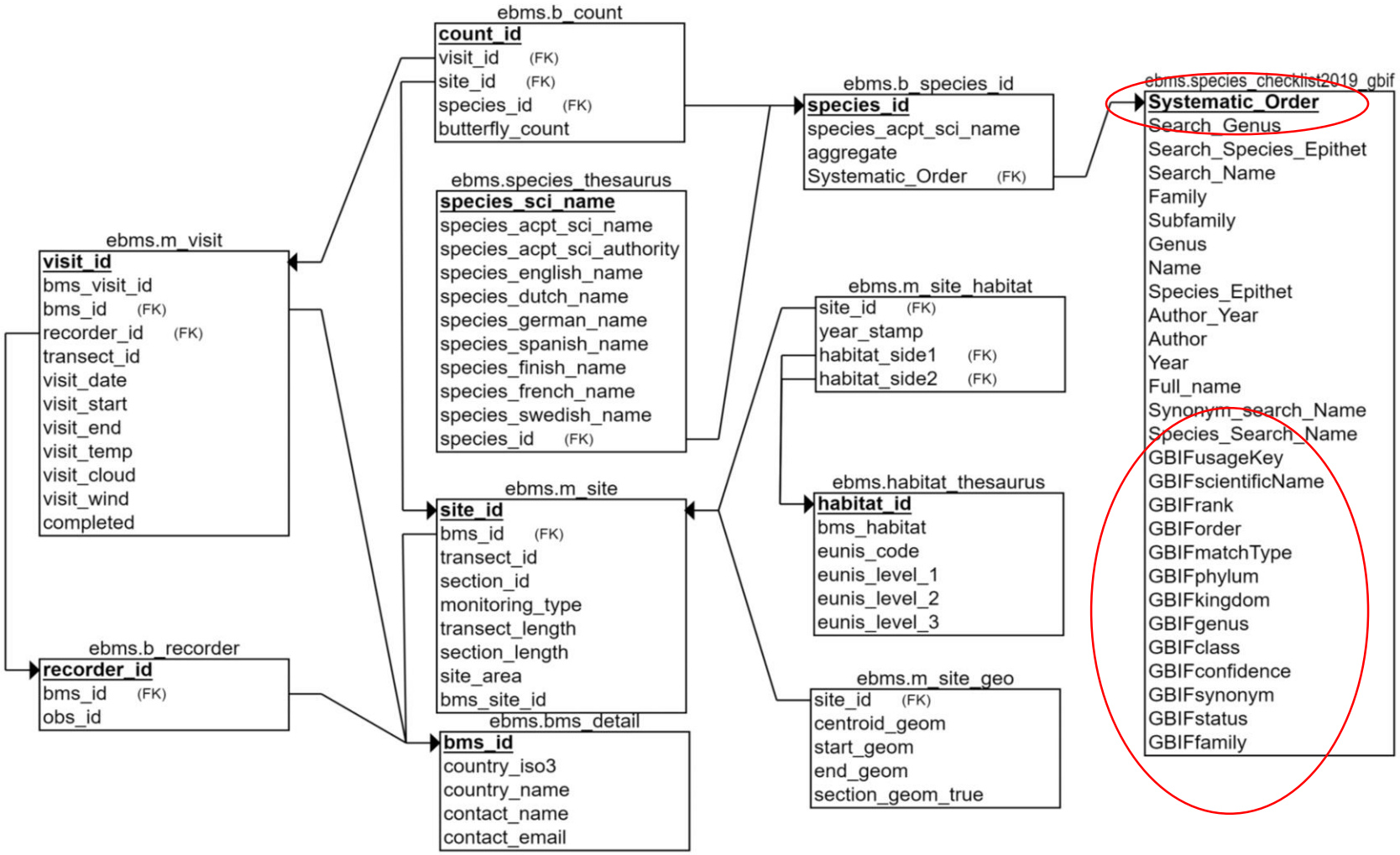


The eBMS data model (v3.0 – June 2020)



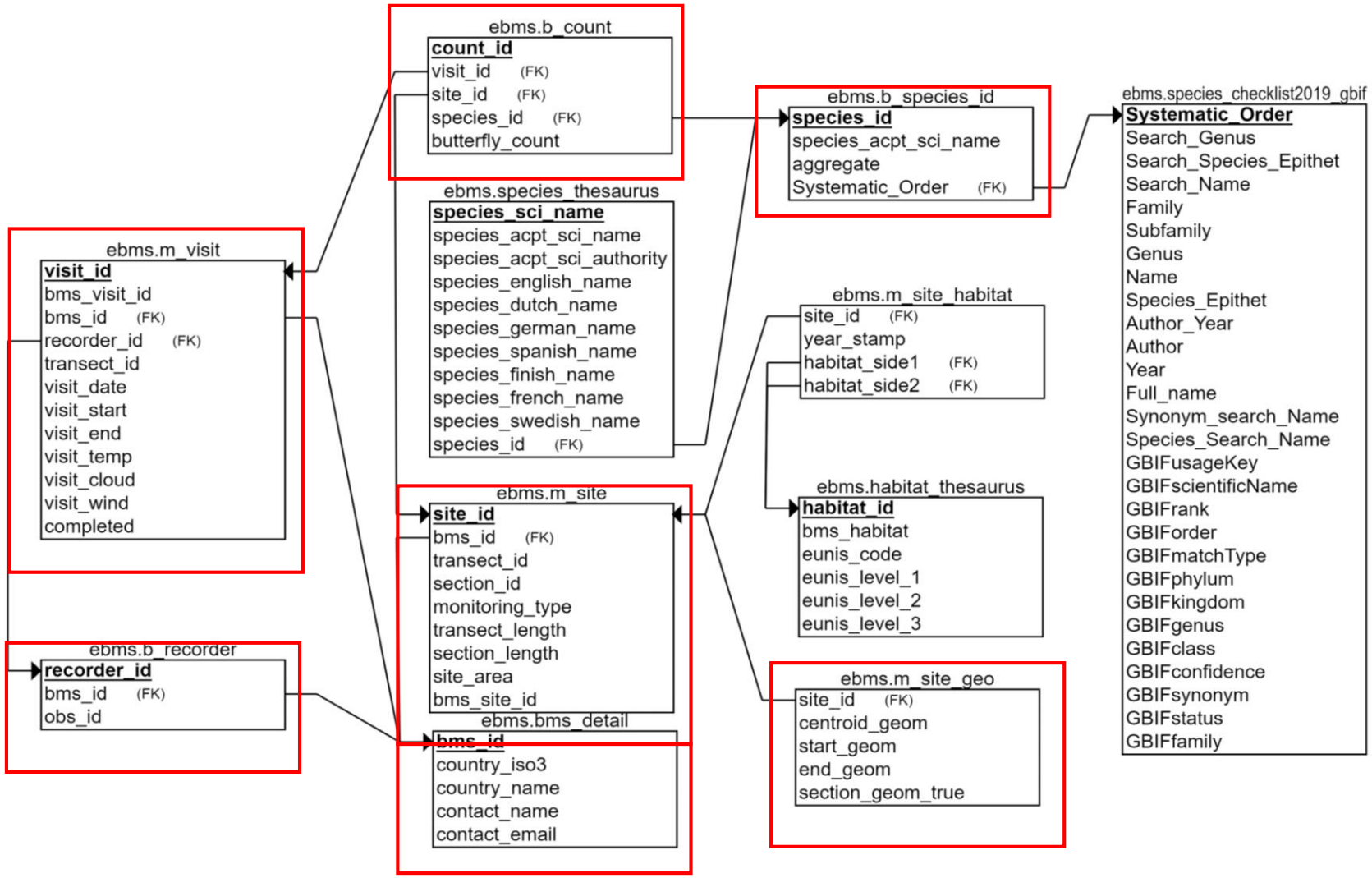
- https://github.com/butterfly-monitoring/ebms_data_model

The eBMS data model (v3.0 – June 2020)



- https://github.com/butterfly-monitoring/ebms_data_model

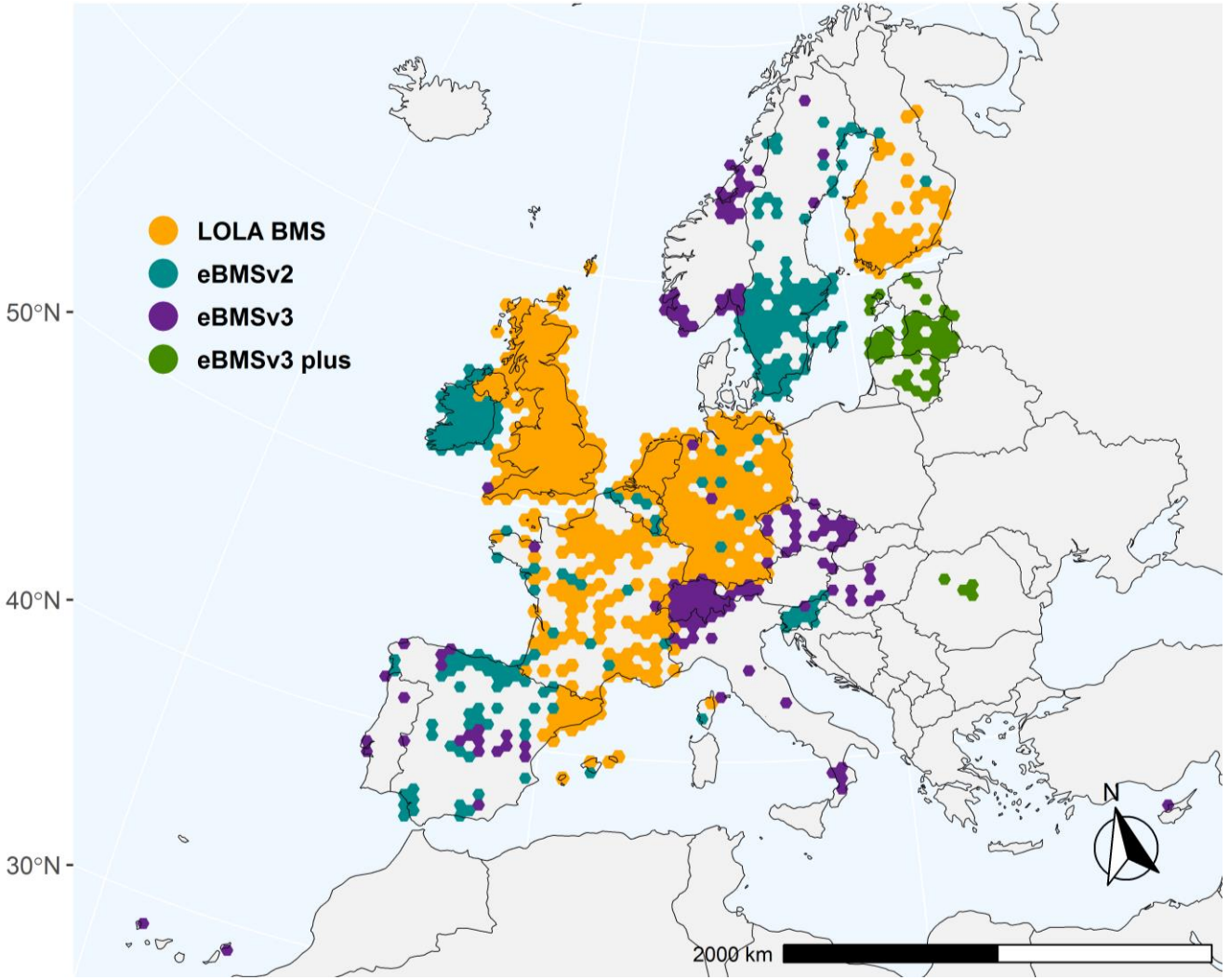
The eBMS data model (v3.0 – June 2020)



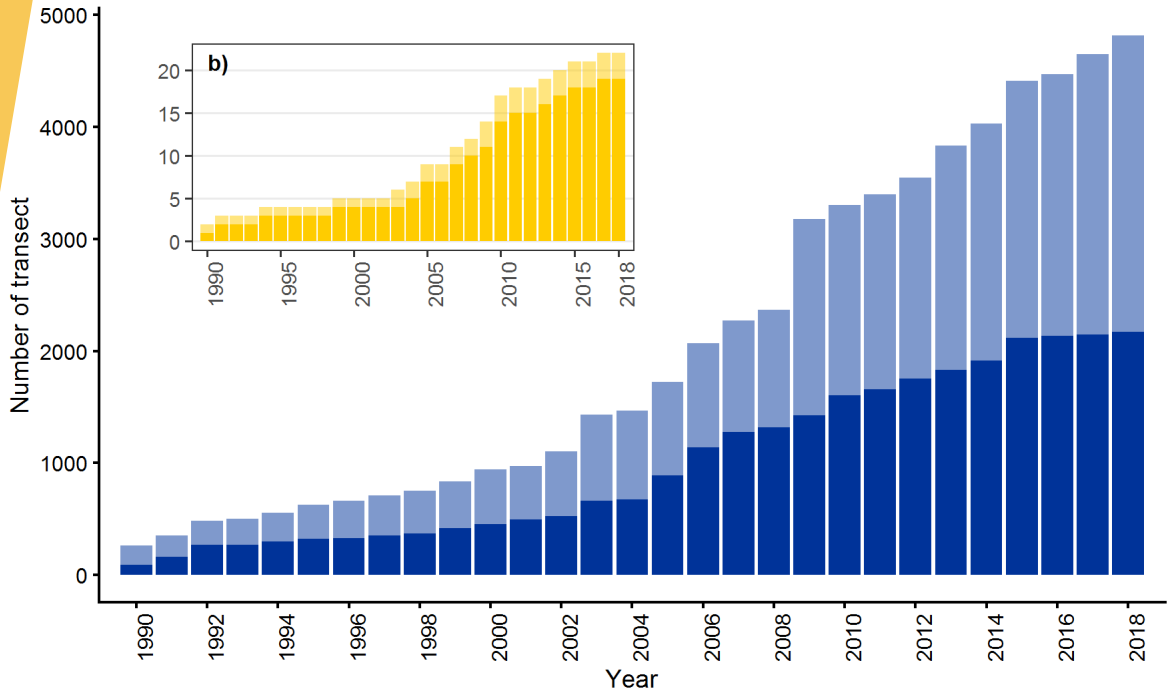
- https://github.com/butterfly-monitoring/ebms_data_model

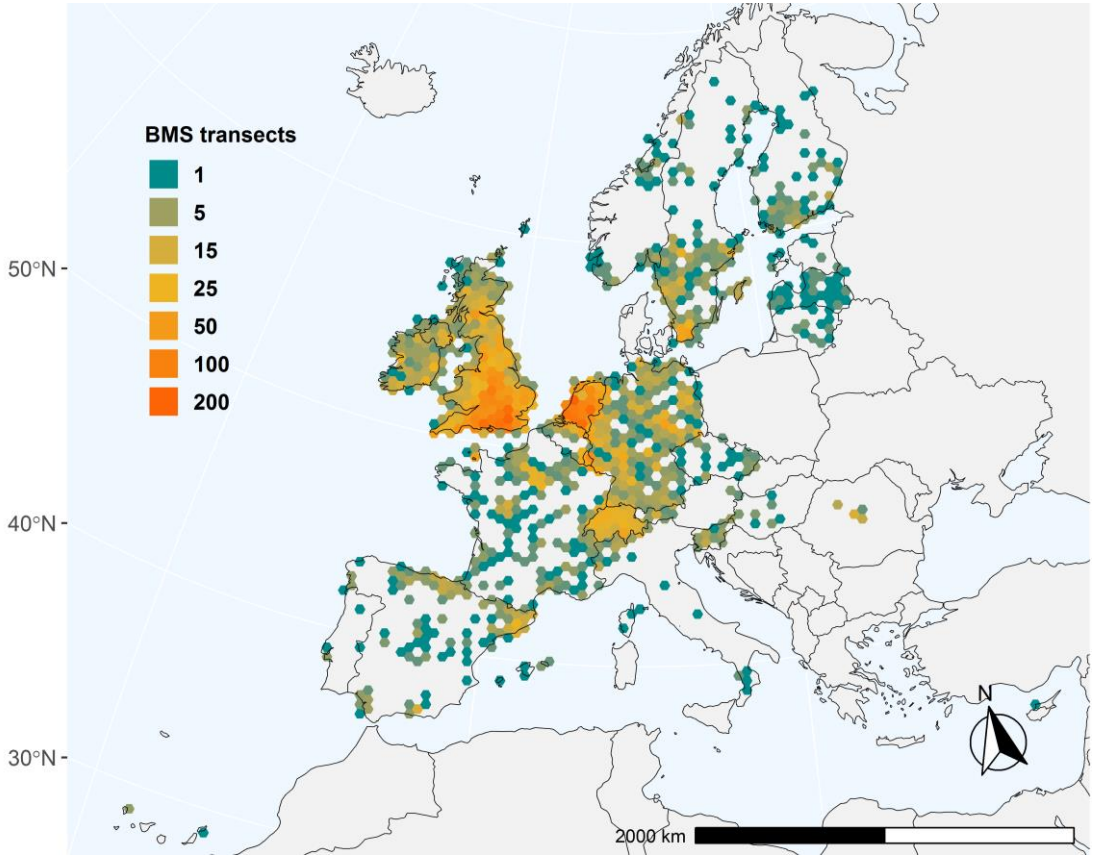
The eBMS data (Geography)

- LOLA BMS (6 schemes) – 2014
- eBMS v2 (13 schemes) – 2018
- eBMS v3 (21 schemes) – 2020
- eBMS v3 plus (24 schemes)



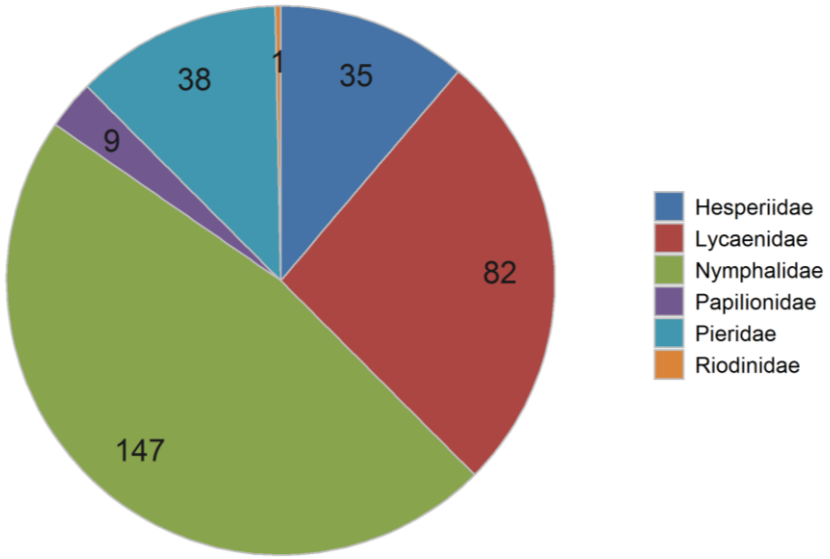
The eBMS data (Density)





The eBMS data (Taxonomy)

- Number of butterfly species per Family monitored in eBMS (312 species).



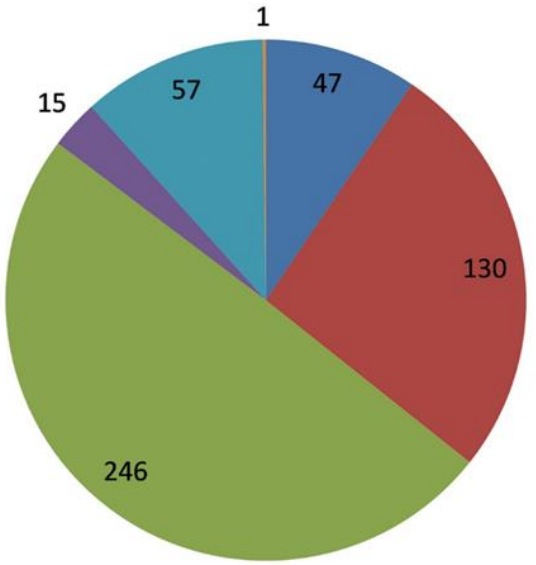
ZooKeys 811: 9–45 (2018)
doi: 10.3897/zookeys.811.28712
http://zookeys.pensoft.net

CHECKLIST

A peer-reviewed open-access journal
ZooKeys
Launched to accelerate biodiversity research

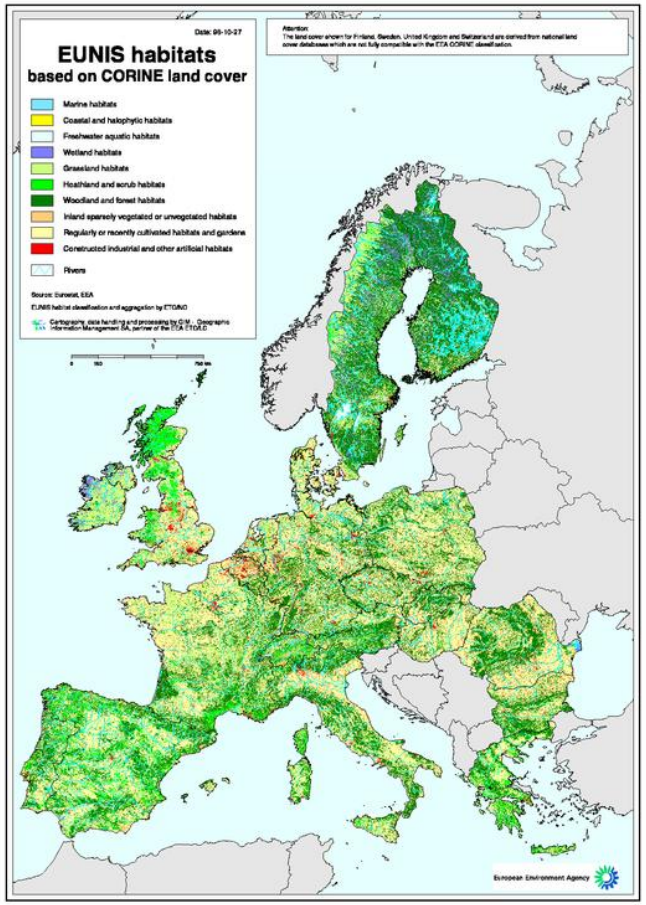
An updated checklist of the European Butterflies (Lepidoptera, Papilionoidea)

Martin Wiemers[1], Emilio Balletto[2], Vlad Dincă[3], Zdenek Faltynek Fric[4], Gerardo Lamas[5], Vladimir Lukhtanov[6], Miguel L. Munguira[7], Chris A. M. van Swaay[8], Roger Vila[9], Albert Vliegenthart[8], Niklas Wahlberg[10], Rudi Verovnik[11]



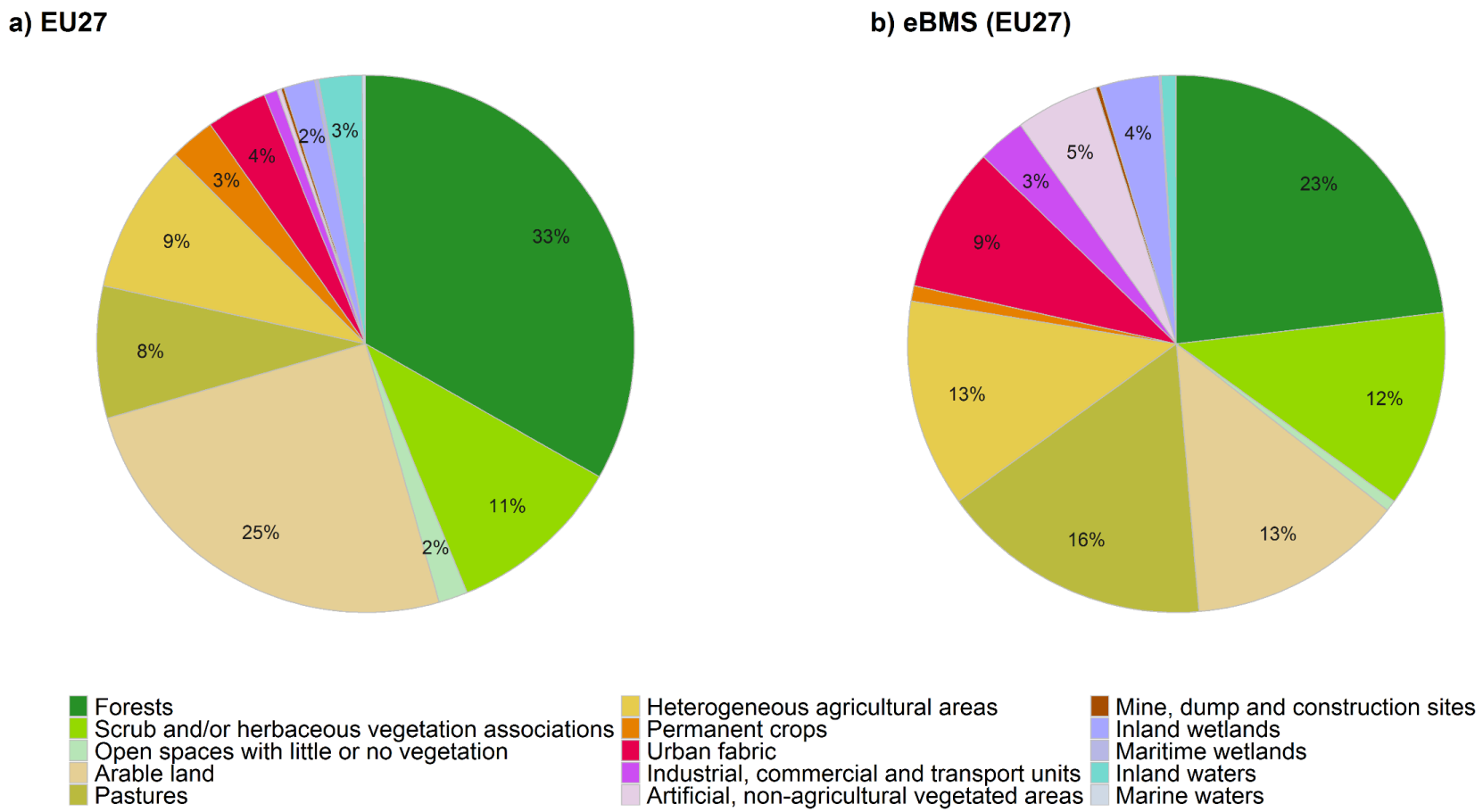
The eBMS data (Land Cover)

- **Transects across European landscapes**



The eBMS data (Land Cover)

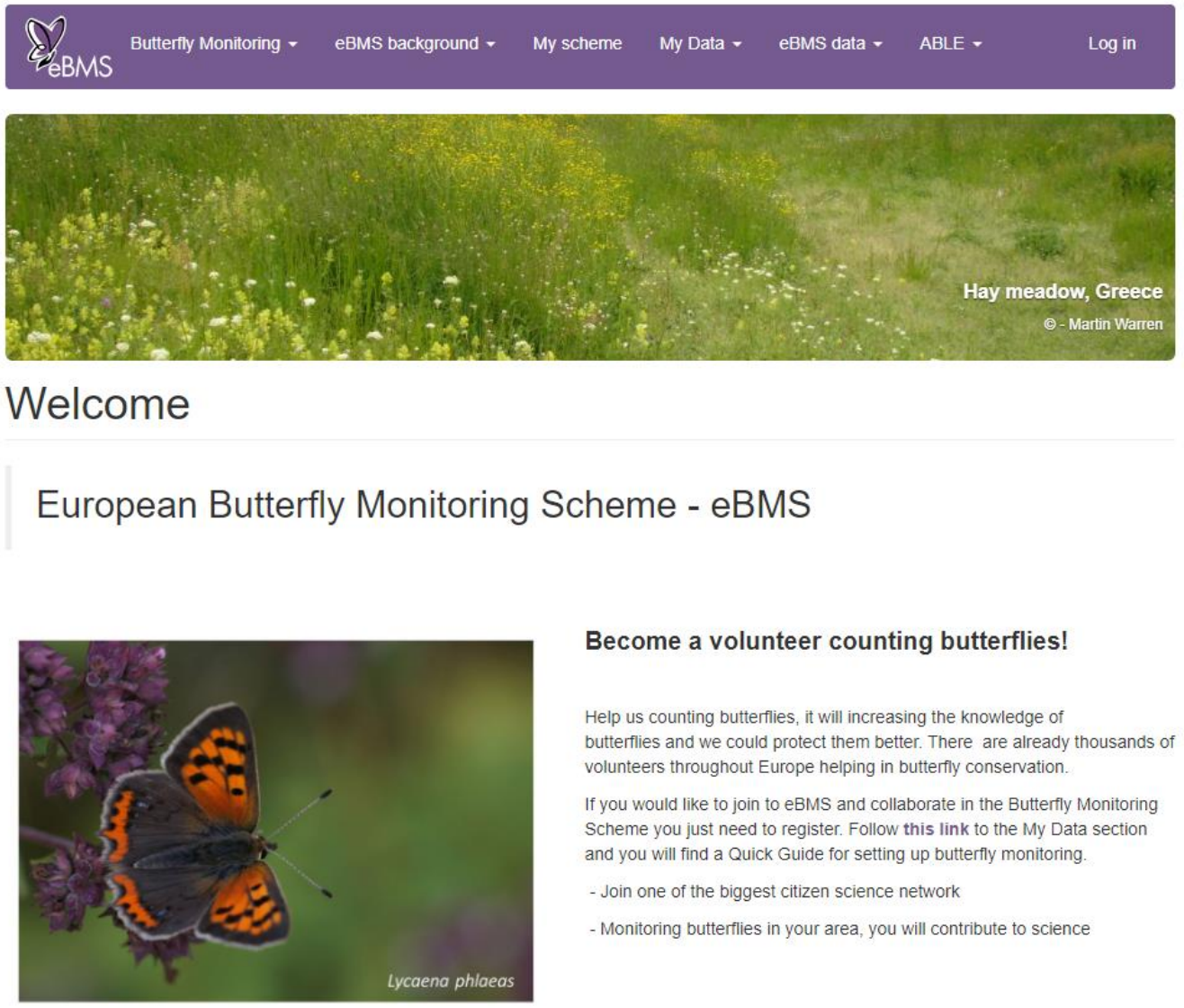
- **CORINE Land Cover 2018 (100 m resolution)**



Website to capture transects

- Website to capture transect data and show results.
  - Website being used by new schemes
  - Multi-lingual
  - For volunteers, with co-ordinators in control
  - Integrated with ButterflyCount mobile app

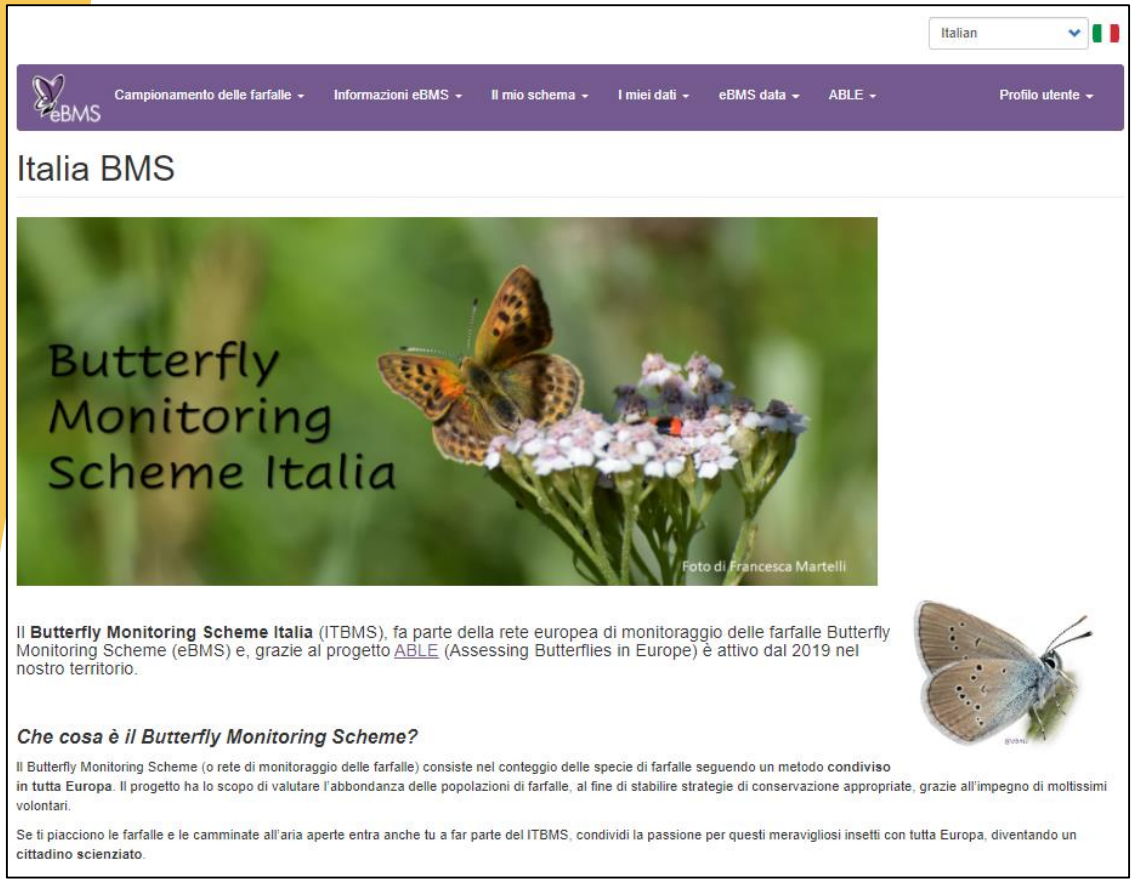
http://butterfly-monitoring.net

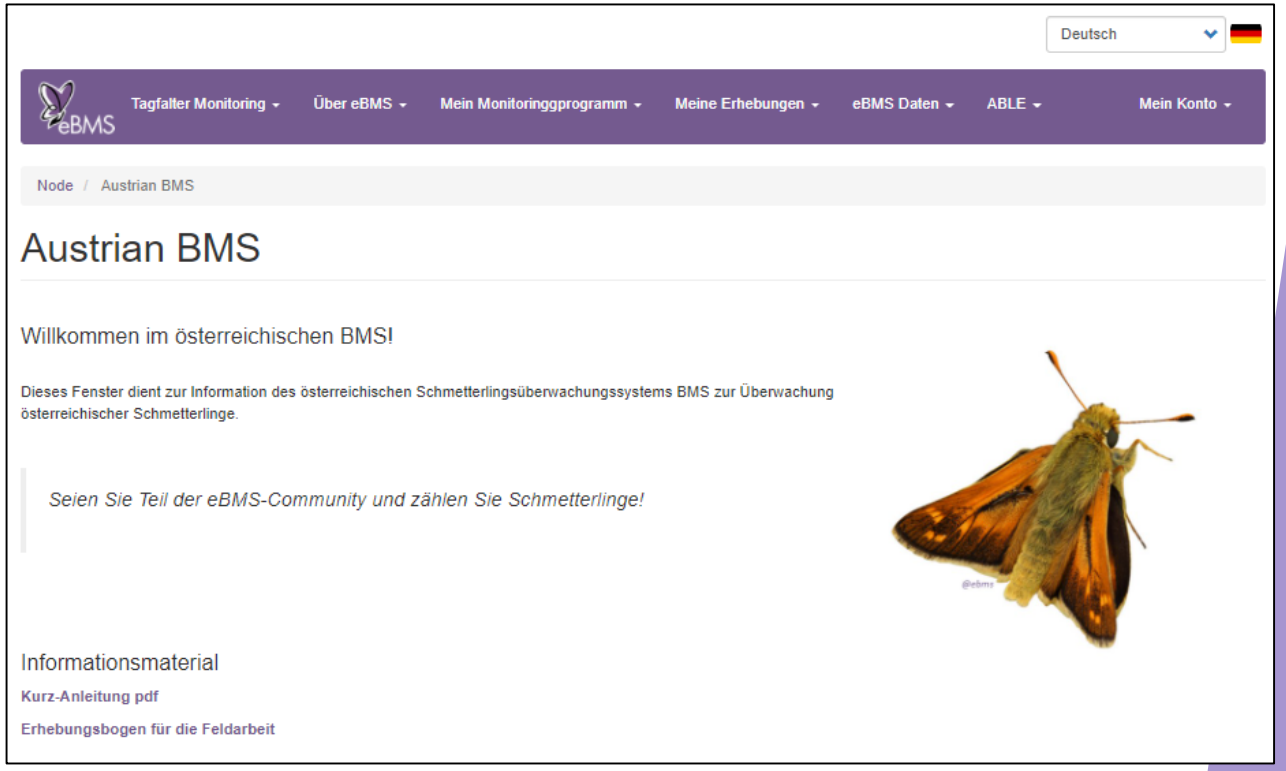


eBMS ABLE

Website to capture transects

http://butterfly-monitoring.net

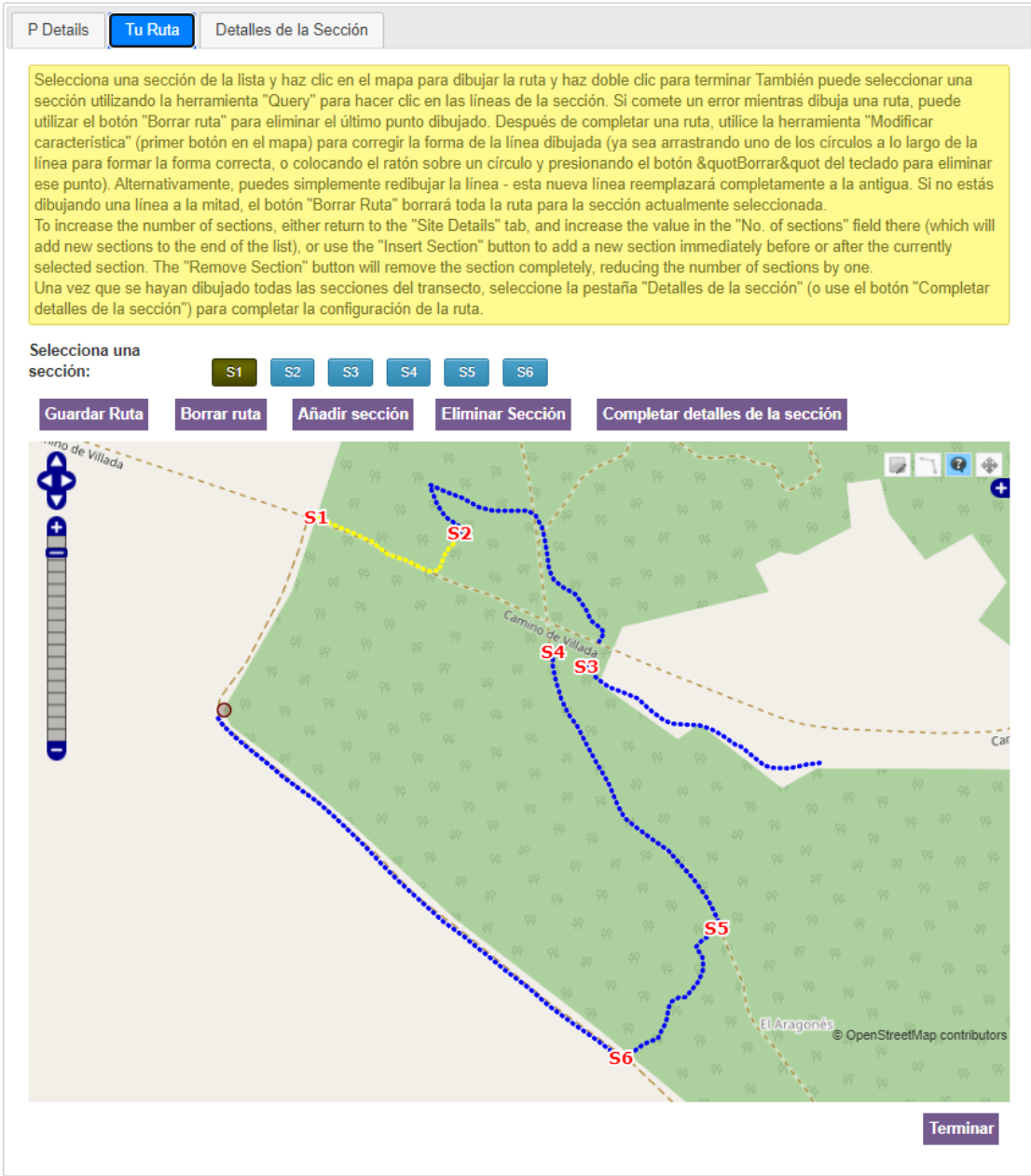




Website to capture transects

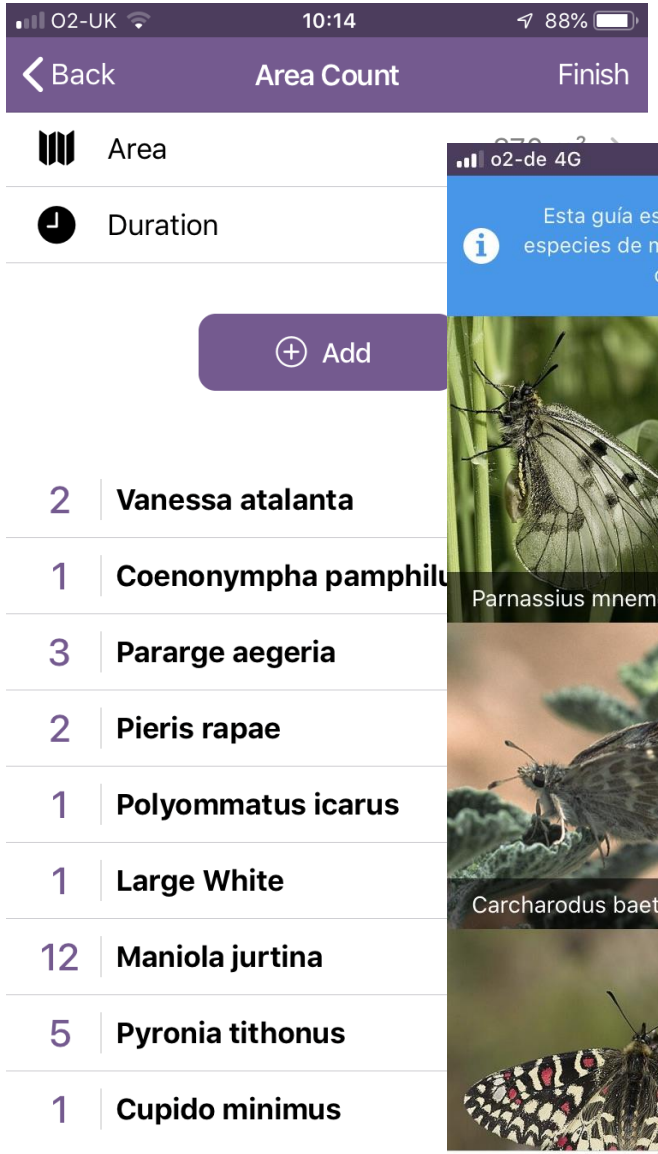
http://butterfly-monitoring.net

- For recorders
  - Setup transect routes
  - Enter transect counts
  - See pages for their scheme
  - View and download their data
- For co-ordinators
  - Same as recorders +
  - Assign users to transect routes already setup
  - Edit data
  - Create new pages for their scheme
  - View and download all data for their region

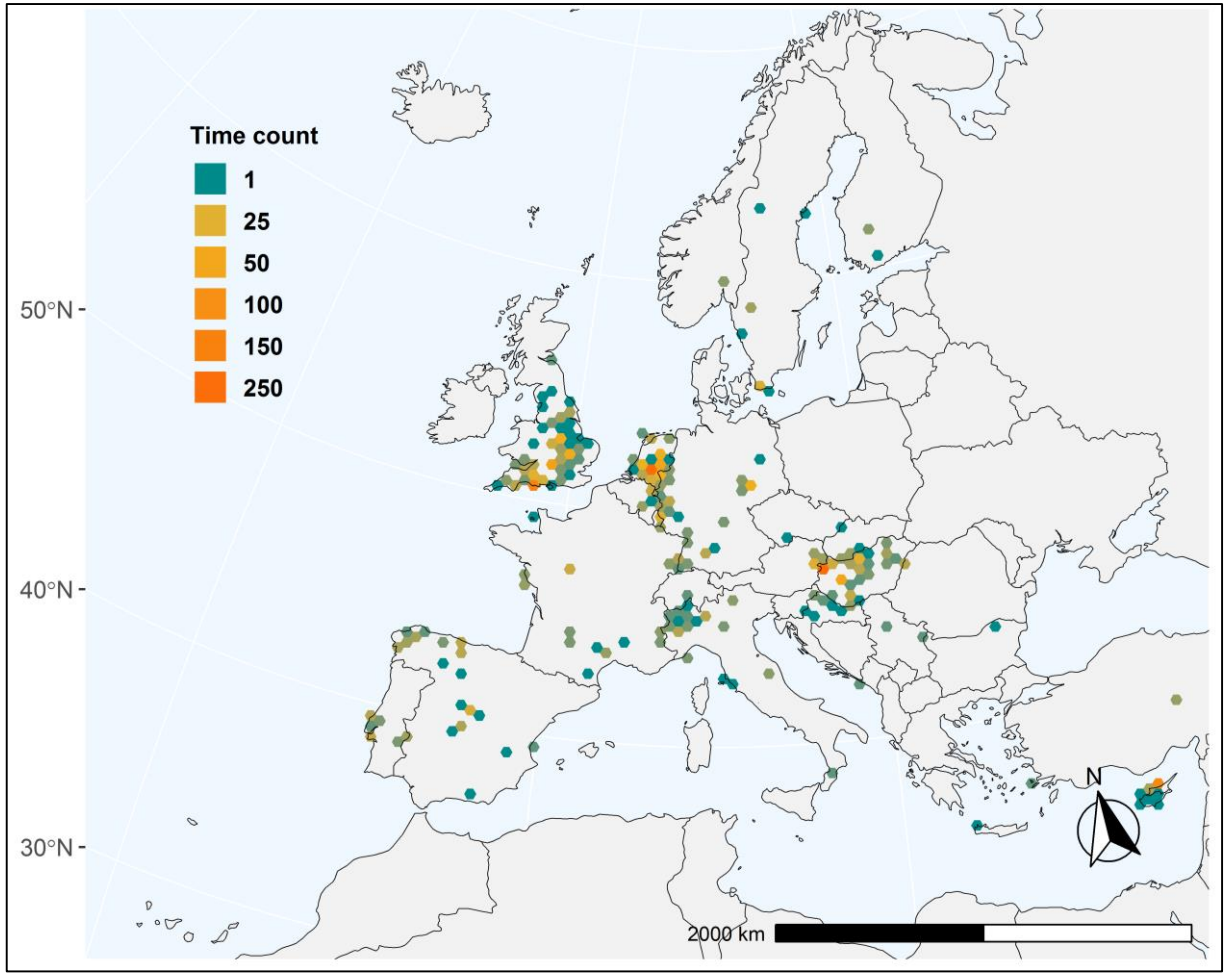


ButterflyCount mobile application

- Available in multiple languages
- Guide to species, filtered for each country
- For entering Transect counts
- Includes new monitoring method – **15 minute counts**
  - Anywhere at any time (rare species, remote areas)
  - Weather data automatically filled in
  - GPS route tracked or area drawn
  - Full butterfly list for Europe, plus moths/bumblebees/dragonflies
  - Freely available for Apple and Android phones
- Data accessible to view and download (by co-ordinators) at www.butterfly-monitoring.net



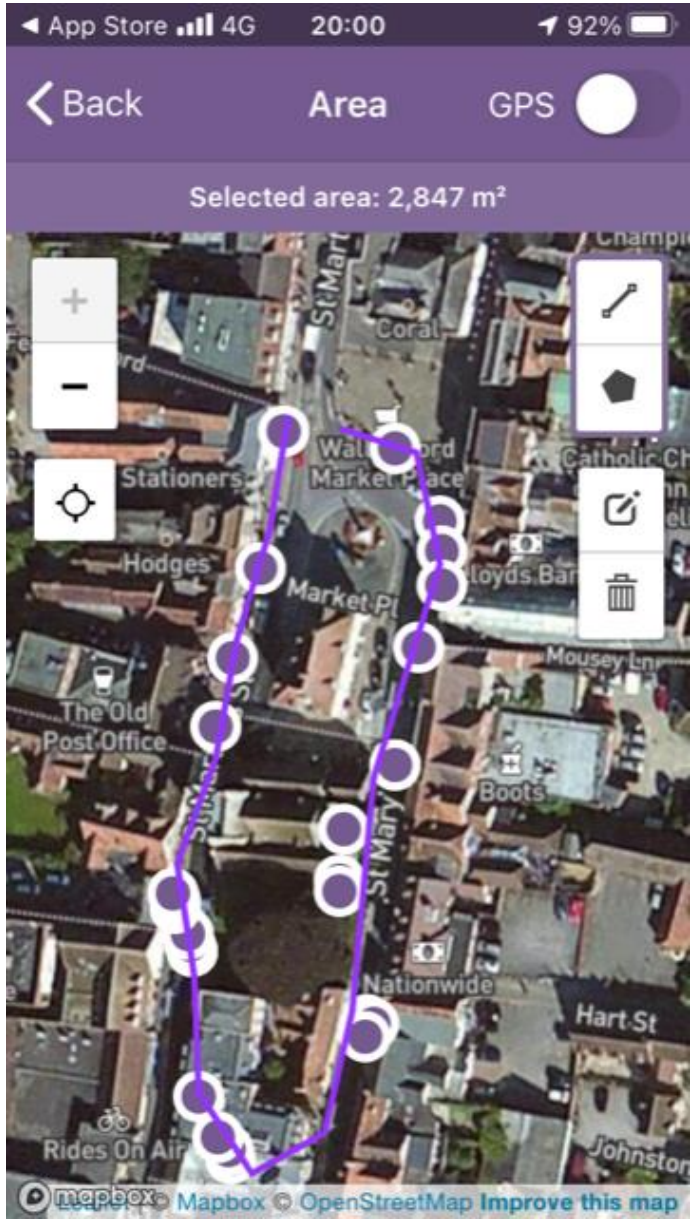
Map of 15 minute counts



Recorders	Records	Species	Samples
Ambrus, Andras	3,149	177	358
van Swaay, Chris	876	164	128
Warren, Martin	676	59	196
van Deijk, Jurriën	576	50	201
Cetinaslan, Marina	324	17	110
Whitfield, Aidan	316	40	43
Szabadfalvi, Andras	305	91	35
Collins, Sur	264	78	33
Laczik, Dénes	228	52	24
Lopez-Vaamonde, Carlos	182	52	25
	10,012	**2,129**	**1,853**

Next steps with ButterflyCount app

- Improved species guide and filtering
  - Gallery and help with identification
  - Filter by colour, shape, size etc
  - Better integration of moths, bumblebees and dragonflies
- Extend 15 minute count to include a precise location for each individual butterfly seen
- ‘Favourite’ sites
- Activity reports, e.g. top recorders, top species recorded etc



http://butterfly-monitoring.net

rbms – (R package)

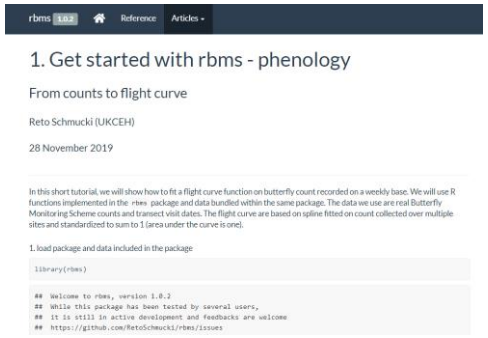
22 functions to interact & analyse BMS data

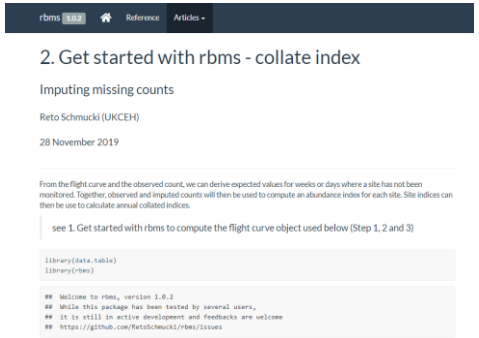
- **Nine essentials**

1. ts_dwmy_table()
2. ts_monit_season()
3. ts_monit_site()
4. ts_monit_count_site()
5. flight_curve()
6. impute_count()
7. site_index()
8. collated_index()
9. boot_sample()

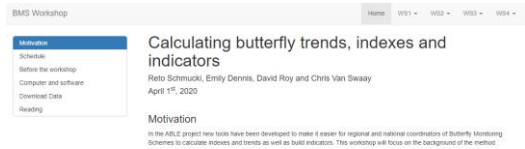
Web resources and tutorials

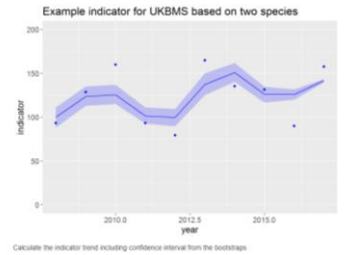
- **https://retoschmucki.github.io/rbms**





- **https://butterfly-monitoring.github.io/bms_workshop/**

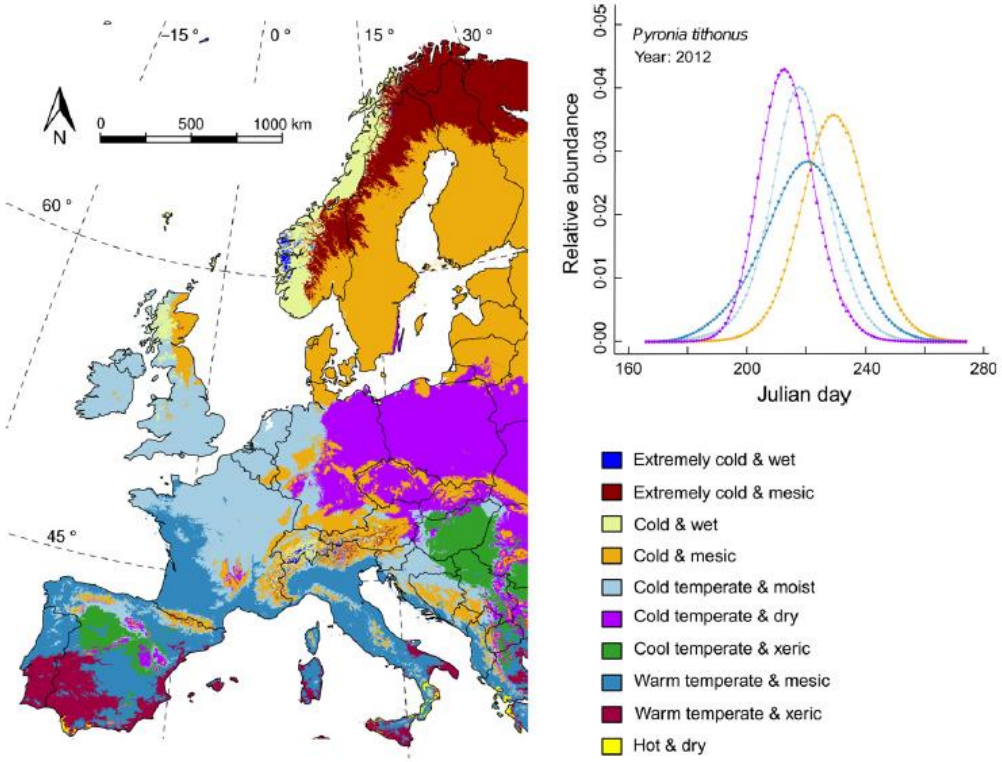




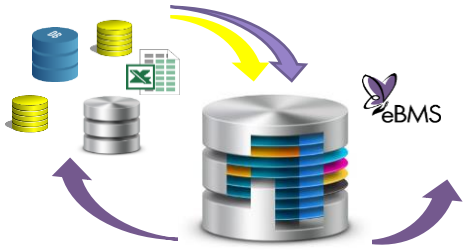
rbms – (Data package)

- Climate data per grid cell (Temp, Prec, GDD)
- Species phenology (Weekly)
- Species distribution (Occupancy)

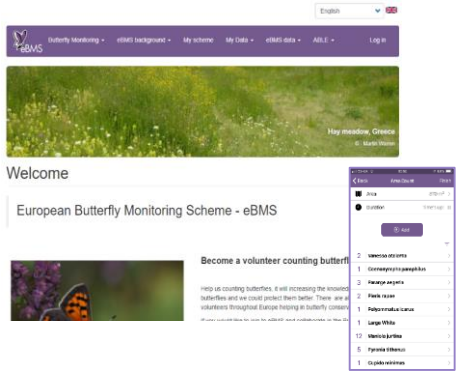
rbms +

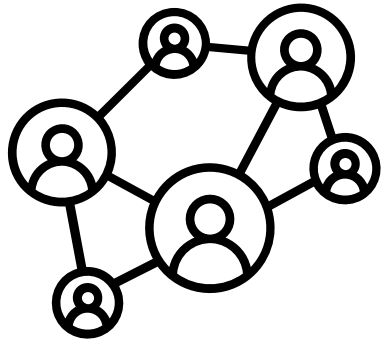


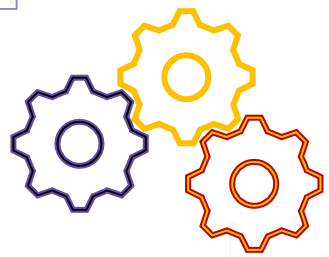
eBMS ecosystem

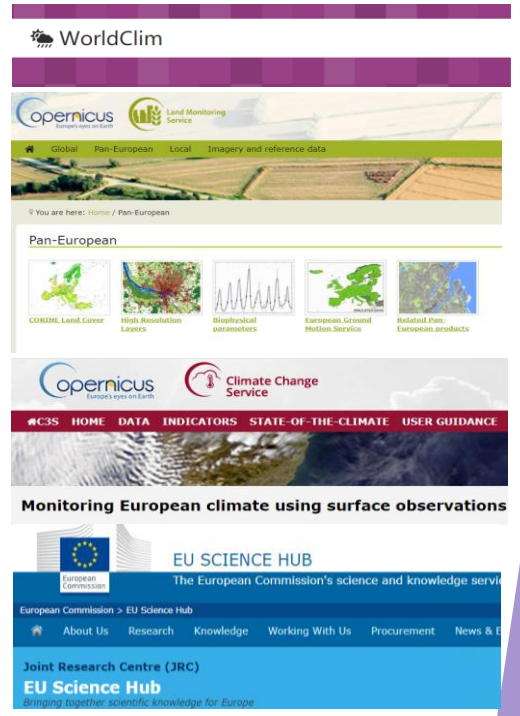


+









PostgreSQL R QGIS

build unknown coverage 63% CRAN 2.1.1 downloads 674/month

rtrim

Reimplementation of TRIM for R

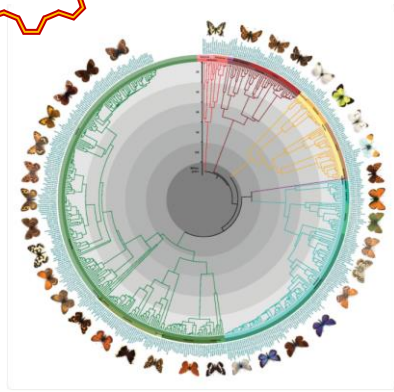
Installation and getting started

To install `rtrim`, issue the following command at the R console.

```
install.packages("rtrim")
```

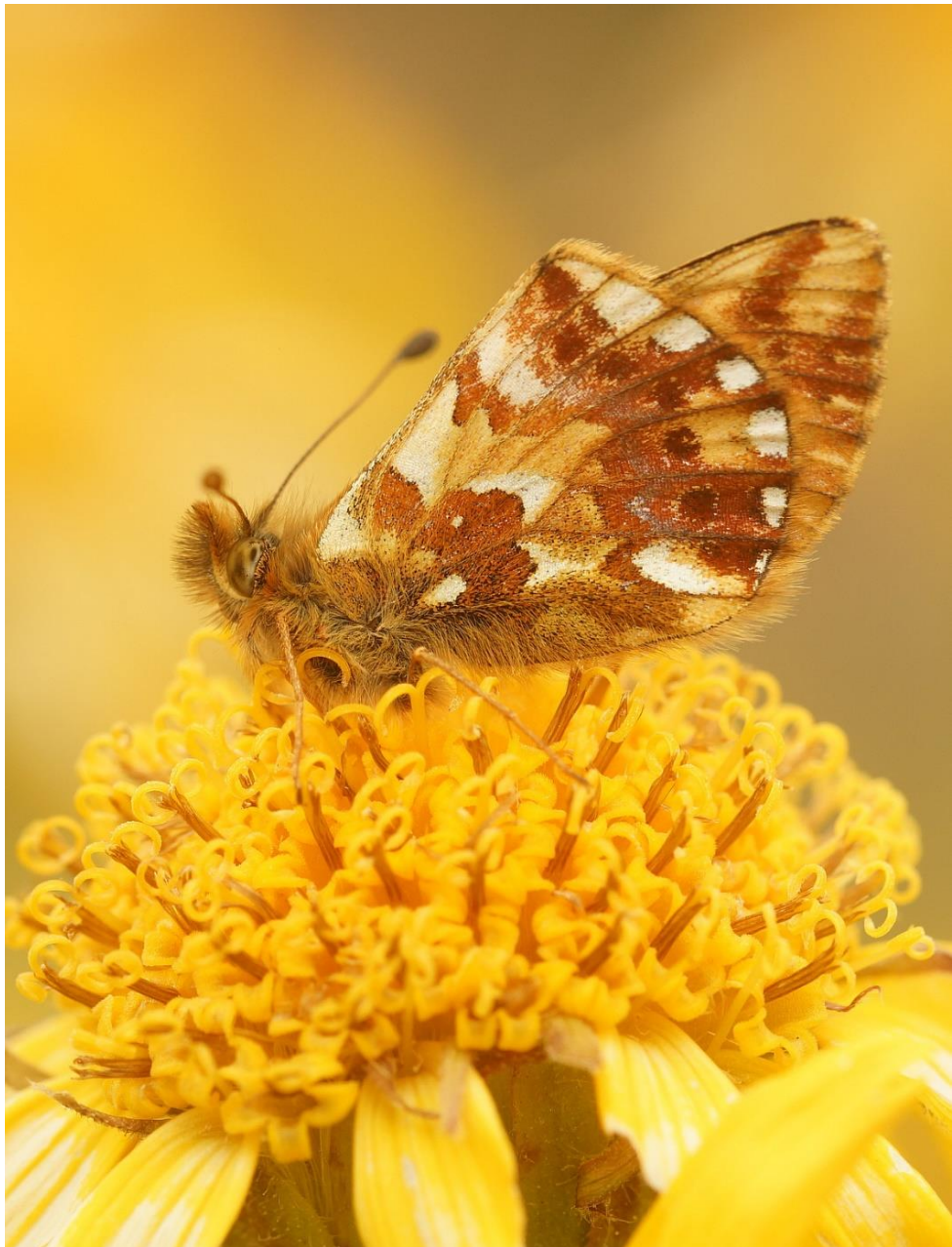
+

rbms



Next steps eBMS

- Tools
  - Improved data capture tools (e.g. ButterflyCount)
  - Interactive tutorials and workshops
  - Data package
- Analyses
  - Phenology covariates (GDD)
  - Localised flight curves
- Data
  - Habitats
  - Monitoring types
  - Detailed geometry (multilines, polygons)



Thanks to:
- The EU and MEPs for funding and support
- Many, many people who have helped the ABLE project