

SPRING RESULTS - EBMS

TRANSECT INCREASE

In recent years eBMS has spread thanks to the support of two European projects; ABLE (Assessing Butterflies in Europe) and SPRING (Strengthening Pollinator Recovery through INDicators and monitoring). These two projects helped eBMS to go further; to establish butterfly monitoring schemes (BMS), to strengthen existing ones, to establish more transects, to recruit more volunteers, to support coordinators and to disseminate more the importance of butterfly monitoring at different levels, social, political and scientific. As the graph of active transects on the eBMS website shows (Fig. 1), there has been a huge increase in recent years, with more countries and transects being added each year: **over 600 active transects** for 2023.

BMS in all EU Member States

One of the major achievements of the SPRING project was to have BMS in all EU countries. Of course, there are different levels of development and some countries are more mature than others (Fig. 2). eBMS will continue to improve the current situation.

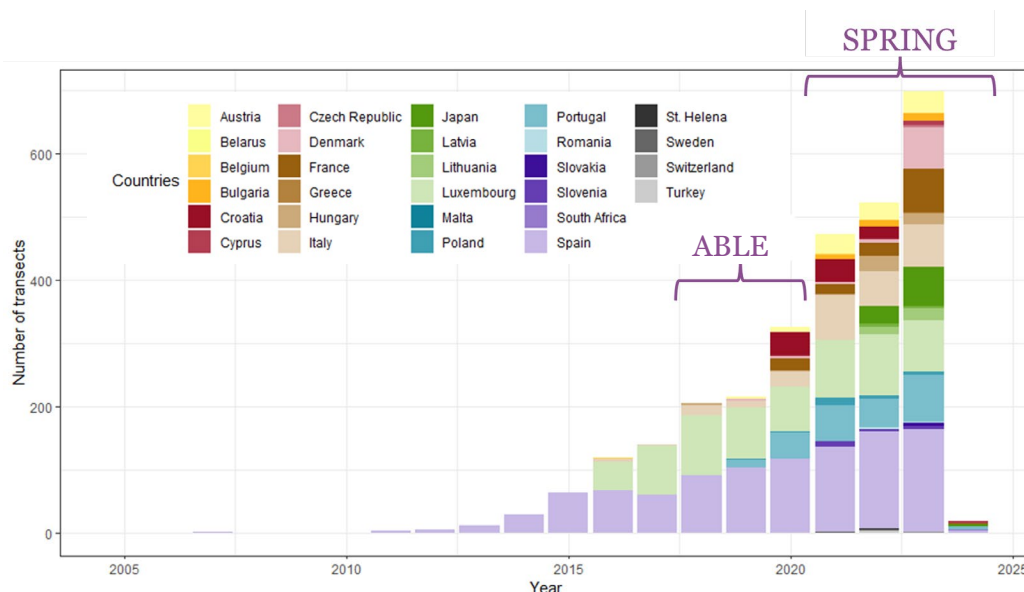


Figure 1. Number of active transects per country and year registered on the eBMS website until to January 2024.

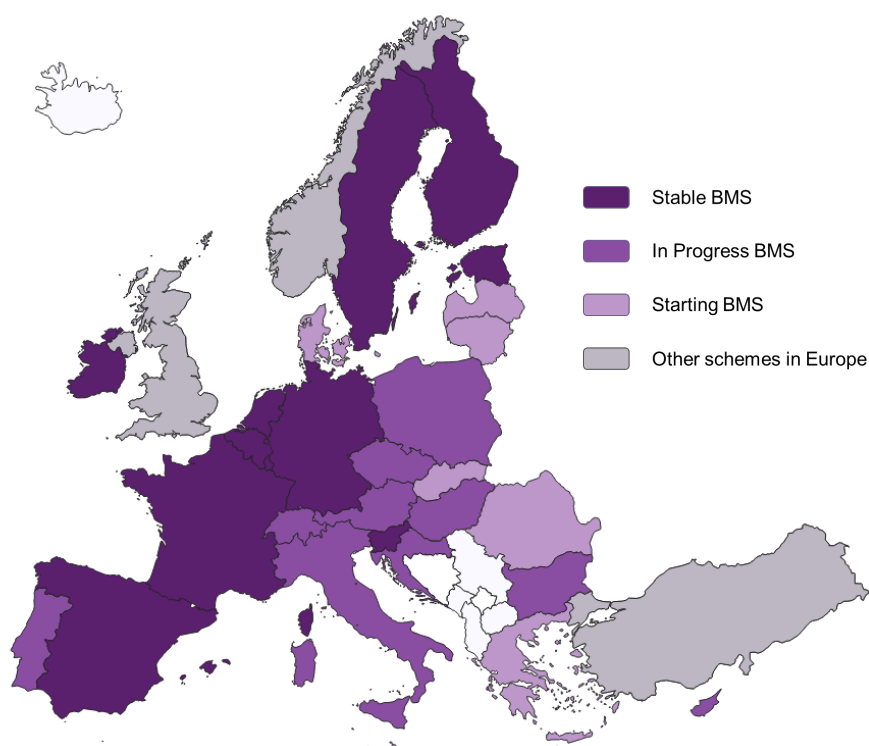


Figure 2. Status of the Butterfly Monitoring Schemes in Europe, purple colors for EU countries and different development by color intensity.

NUMBERS EBMS IN 2021

Total number of counts on transects
16 million

Number of transects **13214**

Total distance monitored **19059 km**

Butterfly species registered **329**

Number of countries **29**

Number of BMSs **31**

** numbers based on data submitted and reviewed to eBMS database 1990-2021 (not all BMSs and website data)*

EBMS DATABASE

One of the most important elements of eBMS system is the central database. All the data collected on the different BMS, different partners of eBMS, are validated and collected in this central database. This makes it possible to compare and analyse data between partners.

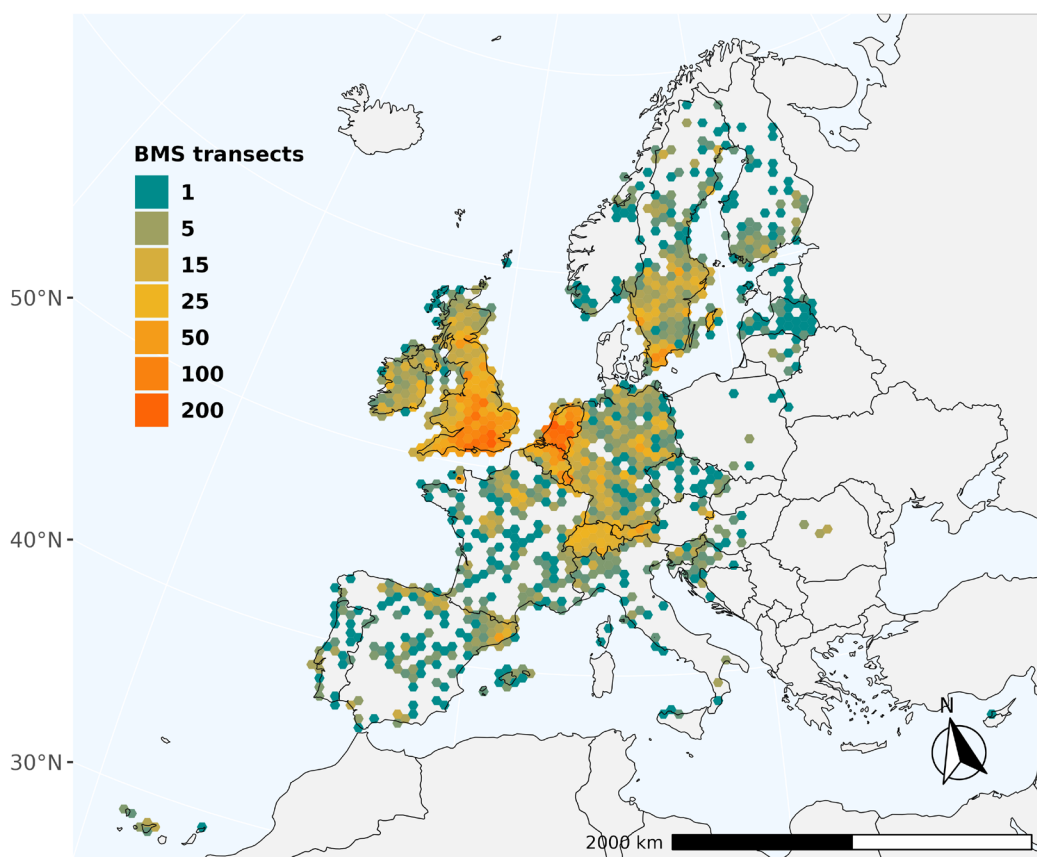
Data collected on eBMS website feeds the central database after validation

Last update of the central database has been done under the SPRING project, the v5.0 gathered data up to 2021. Since 1990, more than **10,000 recorders and volunteers** have counted more than 15 million butterfly count events along transects and documented them at the species level. These counts have been recorded from over almost 1 million monitoring events (transect visits). The spread of the eBMS network is covering every year more area providing quite valuable butterfly data

(Fig. 3).



Figure 3: The density of Butterfly Monitoring transects visited per 50km grid across all schemes that have contributed to the eBMS database (as of v5.0). Densities are calculated from sites that have been visited at least once from 1990 to 2021.



MOTH MONITORING

During the SPRING project, moth monitoring was tested in 5 different countries and climates using an LED trap with a power supply that can be used anywhere. The moth trap is set up at sunset, the sensor activates the LED light (not too strong to only attract moths from the surrounding area) and stays on all night, attracting moths. In the morning the trap is empty and the species and number of moths are recorded.

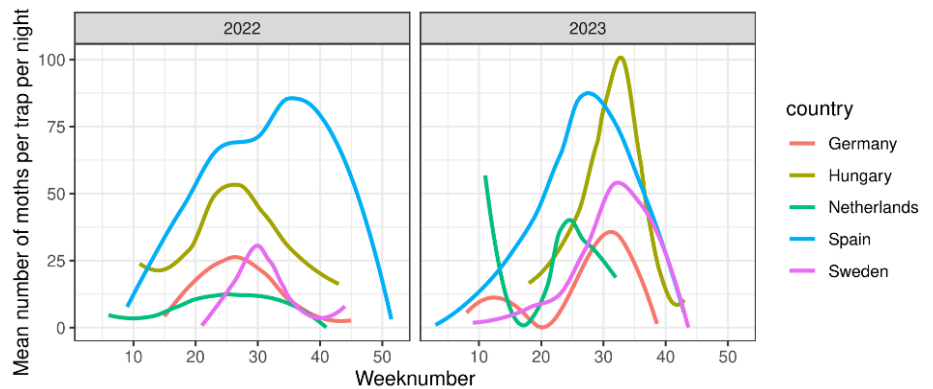


Figure 4: Mean number of moths per trap per night per country in 2022 and 2023.



Figure 5. LED trap using power bank and sensor designed by Vlinderstichting.



During the two years of monitoring, field work was carried out during 3006 nights at 253 sites, **collecting 69426 moths of 1506 species**. Spain and Hungary showed the highest number of species and individuals in the traps (Fig. 4). Thanks to this work, several issues concerning field work (high number of individuals, active moths in the morning), data collection and trap design have been tested and will help us to improve in the future.

Automatic Identification of Moths

Monitoring moths is very different from monitoring butterflies, they are much more diverse and information and expertise is limited. However, we believe that with the help of technology, moth monitoring can be spread across Europe by volunteers and experts working together. In the eBMS app, ButterflyCount, it is possible to register a moth trap visit, including species and abundance of moths, directly in the field, making data collection easier. But the best part is the **automatic identification feature based on Artificial Intelligence (AI)** via obsidentify image recognition of moth images taken from the captured moths in the morning. This feature allows us to involve volunteers with some training in the monitoring of moths. The automatic identification is currently biased towards countries in the west and north of Europe, but eBMS is working on training the algorithm to provide identified images from different regions of Europe.

There is still work to be done (trap production, networking, training), but eBMS sees a promising development of moth monitoring in Europe in the very near future.

More information can be found on <https://butterfly-monitoring.net/bms-methods>.