

European hoverfly trait and distribution data compilation: Achievements and future perspectives

Marija Miličić

BioSense Institute, Novi Sad, Serbia

13th international Symposium on Syrphidae

Why do we need trait and distribution data?



TRAITS

How species function

- Feeding ecology
- Larval microhabitats
- Life-history strategies
- Dispersal ability

+

DISTRIBUTION

Where species occur

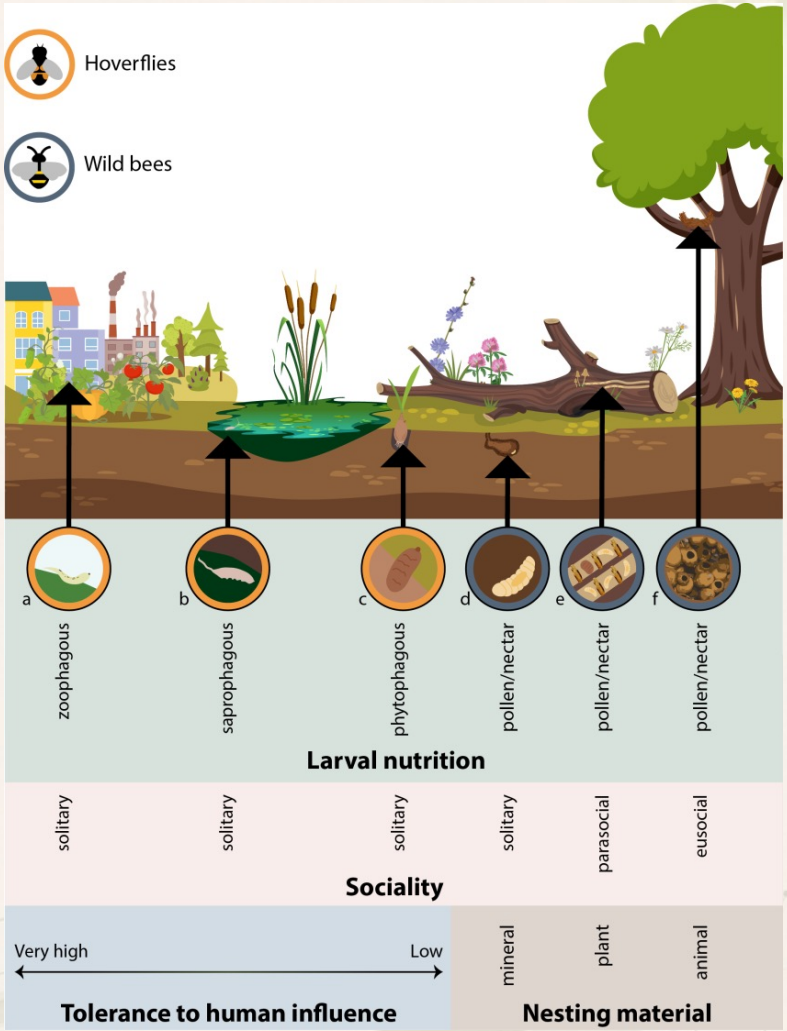
- Geographic ranges
- Diversity hotspots
- Range limits
- Areas of decline

TOGETHER THEY ALLOW US TO PREDICT AND ASSESS

- CONSERVATION PLANNING
- CLIMATE CHANGE RESPONSES
- SPECIES DISTRIBUTION MODELLING
- ENVIRONMENTAL RISK ASSESSMENT

Trait data

- 913 species (based on Reverte, Miličić et al. 2023)
- Five sections: (i) nesting, (ii) larva, (iii) adult morphology, (iv) adult ecology/behavior, (v) distribution
- 26 traits in total
- Data available on Zenodo in user-friendly and machine readable (Taxon Core table + MeasurementOrFact) format



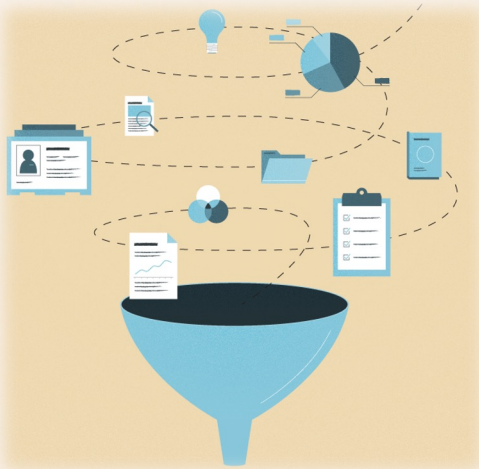
Data sources



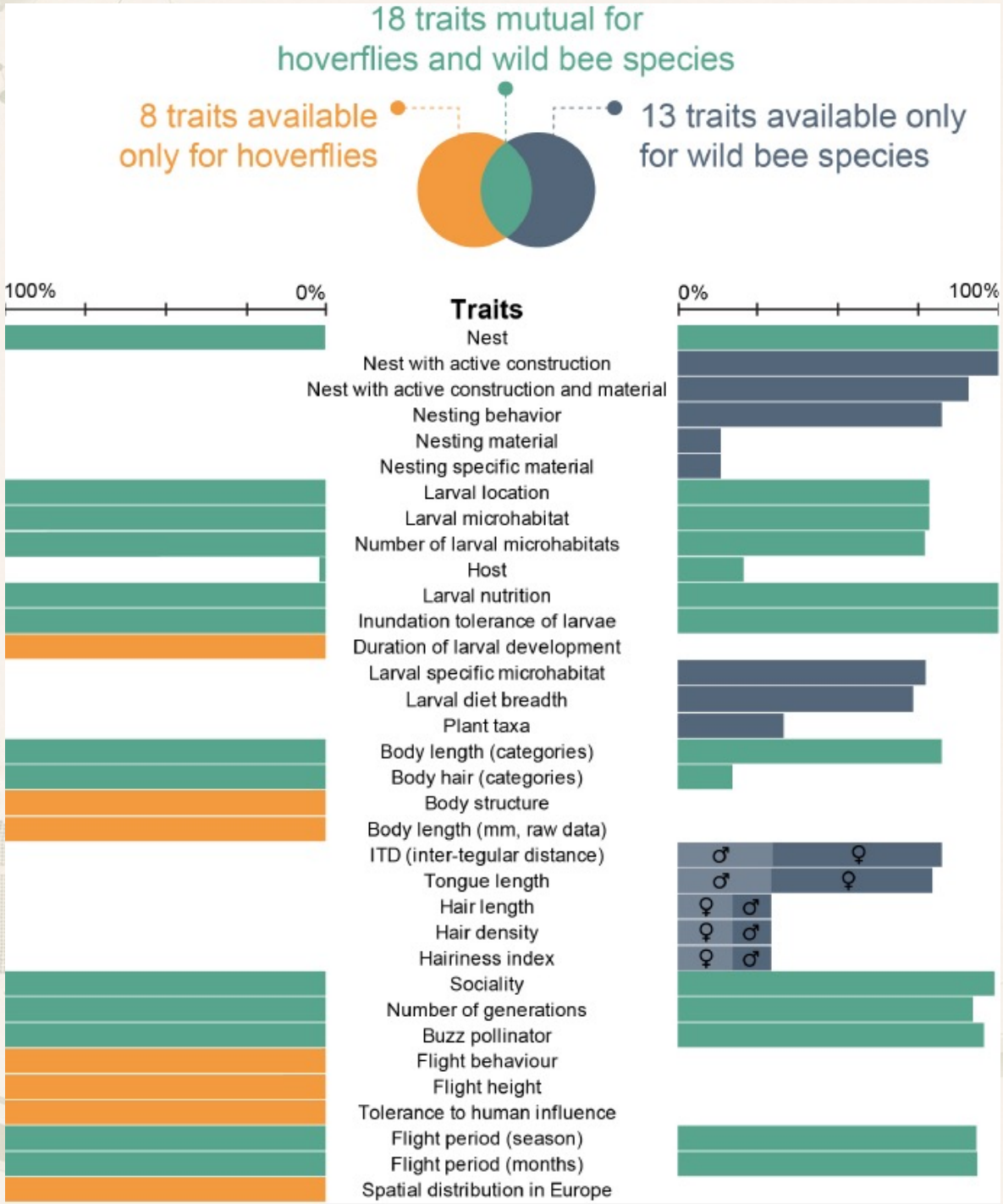
•The data from the **existing literature**: larval microhabitat, host, larval nutrition, duration of larval development, body length (mm, raw data), inundation tolerance of larvae, number of generations, flight period (months) AOO and EOO in Europe

•STI and SCI **calculated using existing data**

•Larval location, the number of larval microhabitats, body length (categories), spatial distribution in Europe and flight period (season) **inferred based on the available data**



•The flight behaviour, flight height, body hair (categories), body structure, adult macrohabitat, nest, sociality and buzz pollinator and the tolerance to human influence **scored from field observations** and based on **opinions of expert taxonomists**

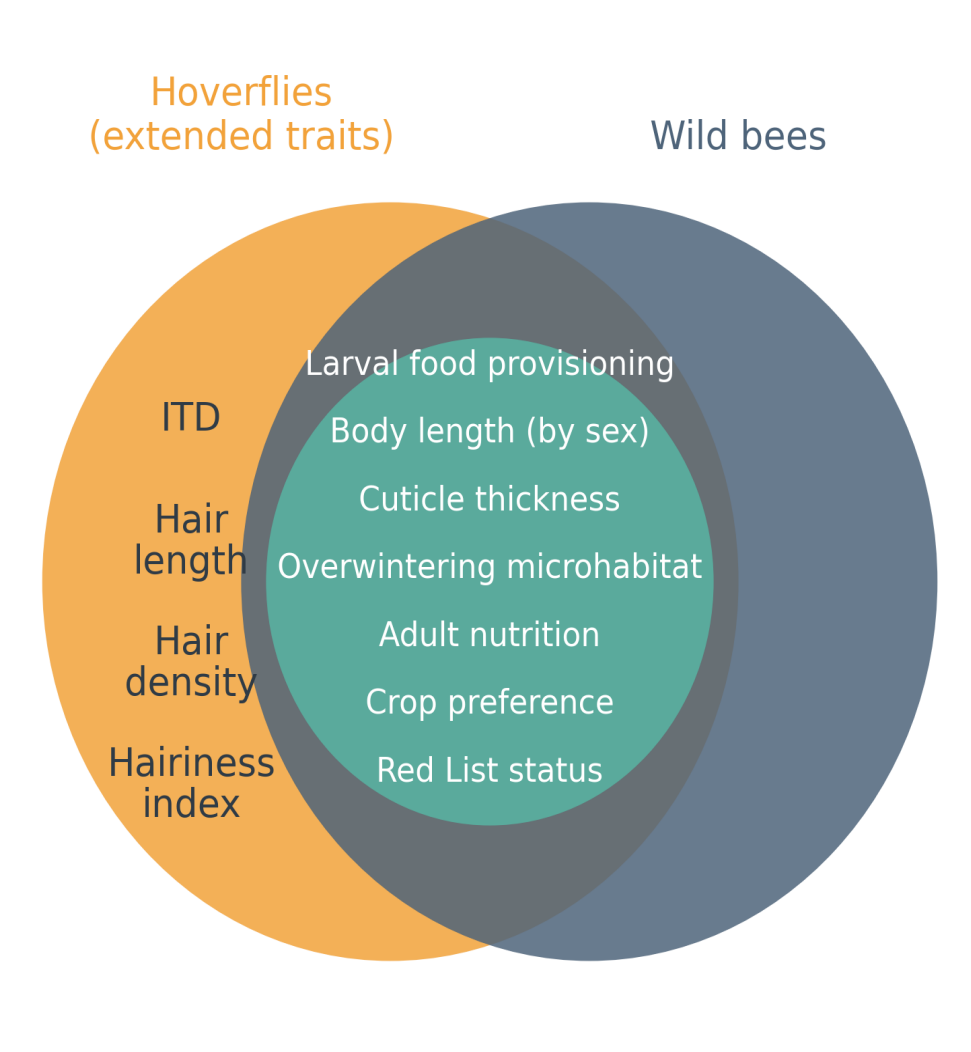




Published in Miličić, Sentil et al. (2026). Trait Dataset for 3,000 European Wild Bee and Hoverfly Species. *Scientific Data*.

Phase II of trait data collection

- Adding new traits and extending the taxonomic coverage of selected existing traits; additional traits linked to pesticide sensitivity
- Selection of priority species



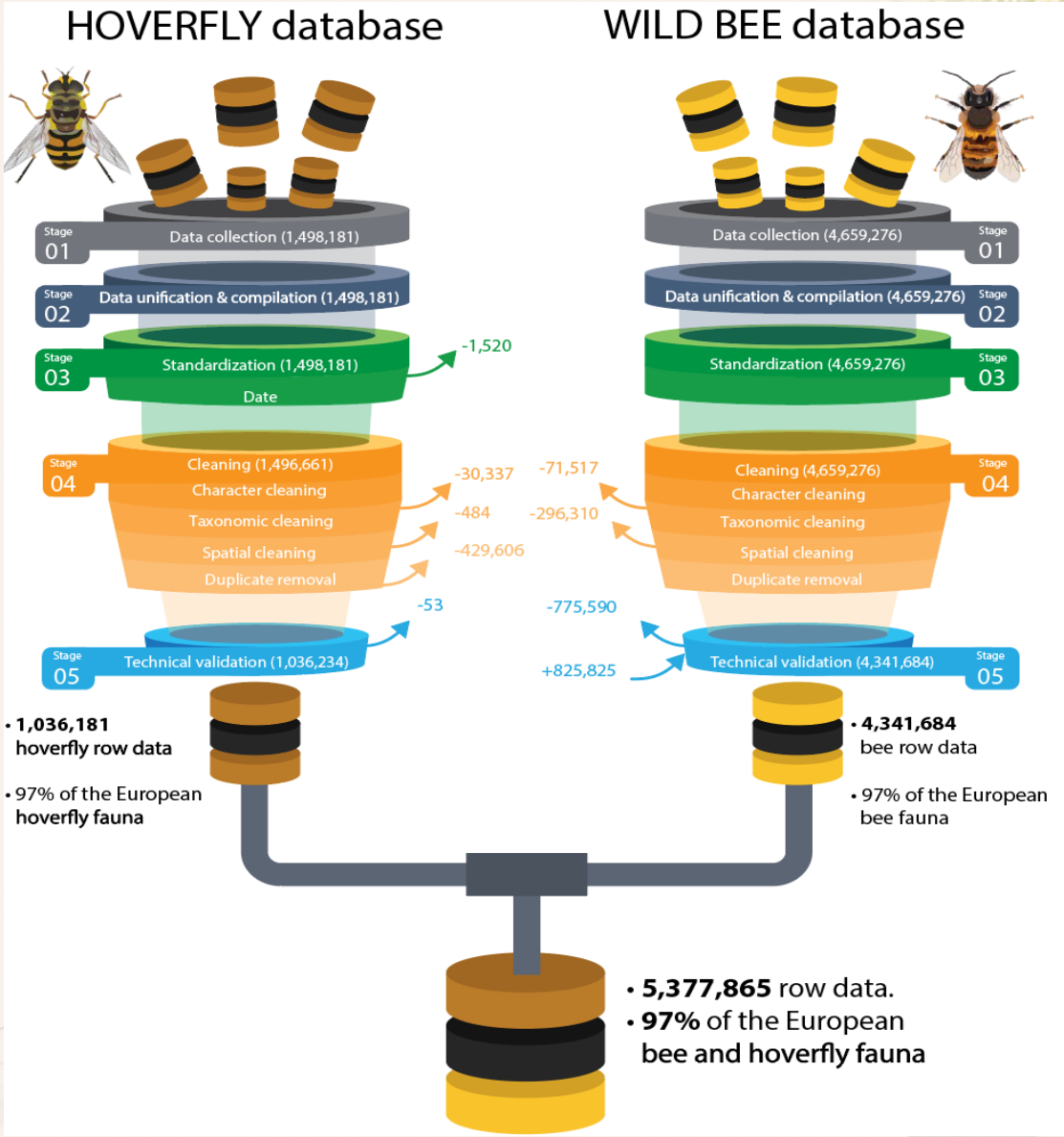
Distributional data sources

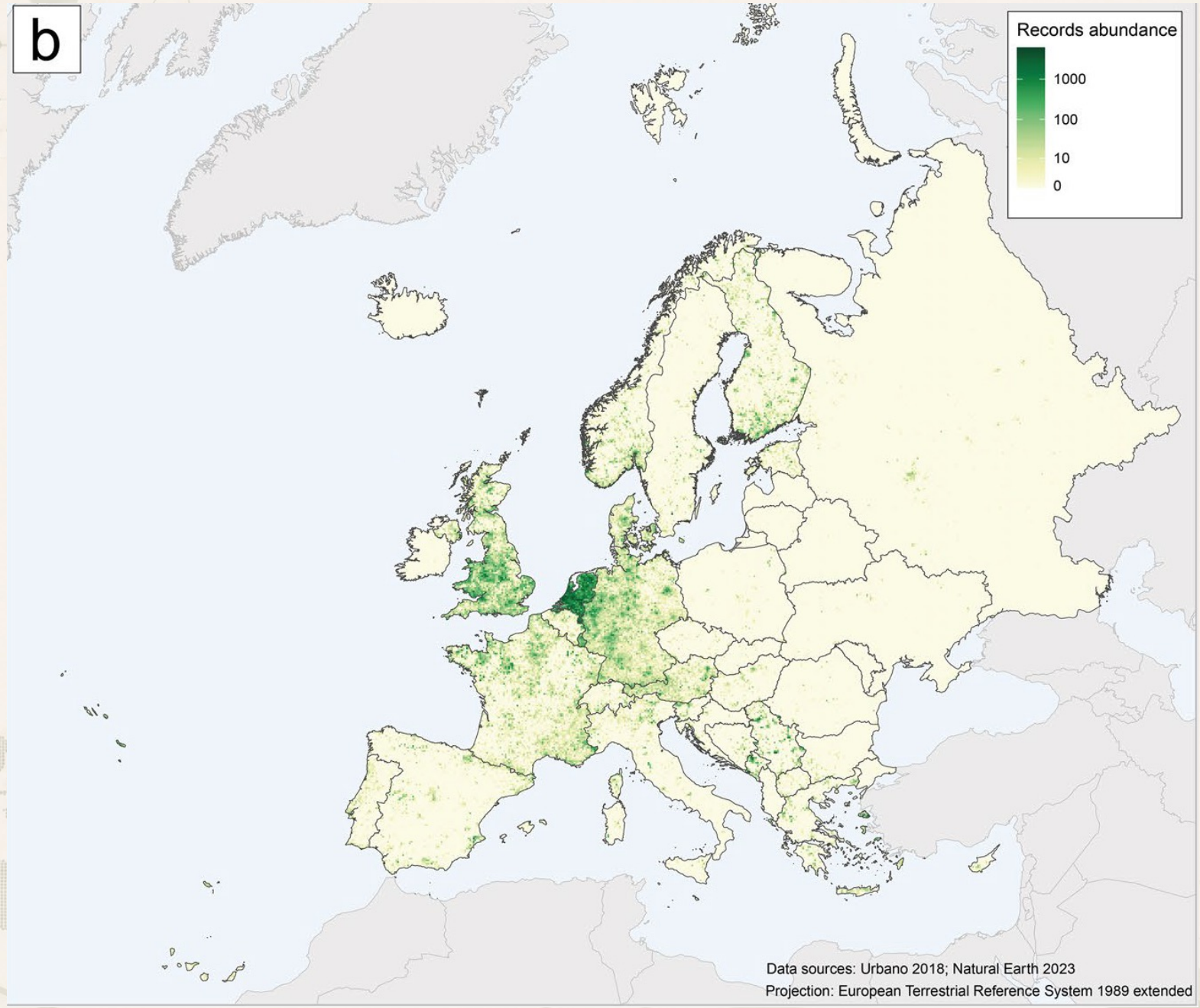


- Projects: European Red List of Hoverflies and Taxo-Fly
- Records obtained from people working on hoverflies
- Publicly accessible platforms (GBIF)
- Institutional databases
- Published litherature

Data handling

- Start: ~1.5 million records
- Clean: ~1.04 million records
- Data available on Zenodo, DwC alligned format
- Details in Sentil, A., Miličić, M., Benrezkallah, J. *et al.* (2026). Synthesised database of wild bee and hoverfly records in Europe. *Scientific Data*





Map of Europe showing the spatial distribution of data for hoverflies at a 10 km grid cell

Phase II – Compiling new distributional data



- Data from phase I that were left uncleaned
- New contacts with data providers
- Data from ongoing and recently finished projects
- Public repositories (e.g. GBIF)

Similar, but improved metodology as for Phase I

Vol. 2

Future perspectives



CURRENT STATUS

913 species traits
One of the most comprehensive trait datasets for hoverflies

1.04 M occurrences
Wide geographic coverage across Europe

Publicly available
Open access via GBIF and dedicated repository

Research resource
Supporting ecological and evolutionary studies

FUTURE DEVELOPMENT

More species & traits
Inclusion of additional species and ecological traits

Better geographic coverage
Improved representation of under-sampled regions

Regular updates
Integration of new data, taxonomic and trait updates

Conservation & ERA support
Stronger basis for SDMs, conservation planning and environmental risk assessment

Take home message



Building comprehensive trait and distribution datasets is an ongoing process and requires continuous community engagement, but the foundations for large-scale hoverfly analyses across Europe are now in place









Thank you for your attention