European Vegetation Archive

Data Request Form

To obtain data from the European Vegetation Archive (EVA), including the ReSurveyEurope Database, please first enquire the EVA database administrator Ilona Knollová (ikuzel@sci.muni.cz) whether the data that meet your needs are available. If they are, please fill in the form below and submit it to Ilona or another member of the EVA Coordinating Board (or ReSurveyEurope Board if you ask for data from the ReSurveyEurope Database).

- Applicant's name:

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- Project title:

  Speed of change in plant and pollinator communities in response to climate change

- Are you asking for core EVA data (non-repeated vegetation surveys) or for ReSurveyEurope data (repeated vegetation surveys)?

  We mainly request ReSurveyEurope data to analyse temporal trends, but would be interested in additionally receiving core EVA data to improve spatial coverage and strengthen the analysis.

- Brief description of the aims and methods of the study:

  Pollination is a vital ecosystem service, essential for both biodiversity and agriculture. Around 87.5% of flowering plant species depend on animal pollinators (Ollerton et al., 2011), and approximately 75% of crop species benefit from pollination (Klein et al., 2007). Despite their importance, pollinator populations are in global decline, largely due to agricultural intensification (Duchenne et al., 2020; Marshall et al., 2023) and climate change (Mathiasson & Rehan, 2020). Recent projections suggest that bumblebees in particular are at risk of continued decline under future climate scenarios (Ghisbain et al.,

2024). Climate change is not only affecting species individually but also altering ecological interactions, such as those between plants and their pollinators. While temporal mismatches due to phenological shifts have been extensively studied (Hegland et al., 2009; Memmott et al., 2007), spatial mismatches—caused by unequal range shifts—remain relatively understudied (Gérard et al., 2020). This research aims to address this knowledge gap by comparing spatial shifts in plant and pollinator communities across Europe in response to climate warming.

To quantify these shifts, we will use the Community Temperature Index (CTI), which reflects the average temperature preference of species within a community and has been widely applied to detect climate-driven community change (Devictor et al., 2008). We will calculate the Species Temperature Index (STI) for each plant and bumblebee species based on historical climate conditions (1970–2000), using maximum summer temperatures derived from WorldClim 2.1 (Fick & Hijmans, 2017). These STIs will then be used to compute CTI values at community level, defined as grid cells across Europe. Linear mixed-effects models (LMMs) will be employed to assess temporal trends in CTI shifts over time. The response variable will be the change in CTI (ΔCTI) between time points, which we will relate to several fixed effects: number of years between surveys, climate warming over the period between surveys, soil type, elevation, slope inclination, slope aspect, and precipitation. Random intercepts will be fitted for location (longitude and latitude). The resulting CTI trends for vegetation and bumblebees will then be compared to evaluate the extent of climate-driven spatial mismatch between plants and their pollinators.

We hope this study will offer new insights into the differential responses of plant and pollinator communities to climate change, with potential implications for understanding and mitigating disruptions in plant-pollinator interactions. It also aims to contribute to the growing body of literature on climate change effects on community composition, using a robust and scalable framework based on CTI. The findings will be highly relevant for both biodiversity conservation and ecosystem service resilience under climate change.

References

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Ollerton, J., Winfree, R., Tarrant, S., Ollerton, J., & Tarrant, S. (2011). How many flowering plants are pollinated by animals? *Oikos*, *120*, 321–326. https://doi.org/10.1111/j.1600-0706.2010.18644.x

- Will someone else be involved in data editing or analysis in addition to the applicant?

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- Estimated time of delivery of results (e.g., manuscript submission):
  May 2026 (Master's Thesis Manuscript)

- Geographic area needed (e.g., countries or range of geographic coordinates):
  All areas included in the database

- Do you need plots to be georeferenced? If so, what is the minimum accuracy of plot location (in metres or kilometres) needed for your project?
  Yes, with a minimum accuracy of 5 km.

- Vegetation types needed (syntaxa):
  All

- Other data selection criteria:
  - The year should be assigned.
  - The plant community composition should not be directly manipulated by sowing, planting or removing of species.

- Envisaged publications:
  Master's thesis and potentially one paper in a peer-reviewed scientific journal.

- Data deposition. Some journals require data used for the analysis to be stored in a public repository to ensure the repeatability of the analysis. According to EVA Rules, you are not allowed to store the original vegetation-plot data obtained from EVA. However, if you plan to publish in such a journal, you may deposit a reduced EVA-derived dataset that (1) would make it possible to repeat the analysis published in the paper and (2) does not contain any information not used in the analysis. For example, such a dataset can contain only a subset of species (e.g., only angiosperms or only neophytes), or replace species names with codes, or replace species cover values with presences/absences, or remove all the header data, or replace the exact plot coordinates by coarse grid-cell coordinates etc. If you plan to deposit reduced information from vegetation plots, please describe here what might be deposited. If the project developed so that you needed to deposit more information than specified here, you would need to ask specific permission from the Custodians of the EVA databases used in your analysis before the dataset is deposited.

  Depending on the journal, we might need to deposit a reduced dataset, which possibly would comprise species richness, and if needed also plot sizes and blurred coordinates of the plots used (i.e. aggregated to a coarse spatial resolution). We will NOT publish the species composition of the plots, nor other header data not used in the analyses.

- Plant trait data from the TRY consortium. If you plan to combine your analysis of vegetation-plot data with plant trait data, you can also request a dataset of 18 gap-filled traits for a large number of plant taxa prepared by the TRY consortium. These traits include Leaf area, Specific leaf area, Leaf fresh mass, Leaf dry matter content, Leaf C, Leaf N, Leaf P, Leaf N per area, Leaf N:P ratio, Leaf delta15N, Seed mass, Seed length, Seed number per reproductive unit, Dispersal unit length, Plant height, Stem specific density,

Stem conduit density, and Conduit element length. This dataset can be provided to you by the EVA manager together with the vegetation-plot data. If you use this dataset, you must inform about your project the TRY data contributors who might be potentially interested and invite them as potential co-authors, assuming they will make an intellectual contribution to your paper. The list of the TRY data contributors will be sent to you together with the gap-filled trait dataset.

No

- Specification of the co-authorship arrangements in publications based on the requested data. Note that the EVA Rules recommend that co-authorship is offered to a representative of each database providing data that are particularly important for the project (e.g., a relatively large proportion of the final dataset used in the analyses or data from unique vegetation types or under-represented geographic areas). This database representative should be an expert in the topic of the project (not necessarily the custodian or deputy custodian), and this person should contribute to the project more than just by providing the existing data, e.g. by intellectual contribution to the concept of the paper, preparation of new data, or helping with data analysis, interpretation of the results or writing parts of the paper (see the IAVS Code of Professional Ethics: https://www.iavs.org/page/governance_code-of-proffesional-ethics). The project leader should enable active participation by regularly informing potential co-authors about the progress of the project from its early stage. The project leader should also make final co-authorship arrangements based on the real input of the individual contributors.

If a paper would result from the research, we will offer co-authorship to representatives of databases of particular importance in our analysis (e.g. those that contribute to at least 1% of the data in the final dataset) following the guidelines of EVA and ReSurveyEurope. However, we expect intellectual contribution beyond data provision, for example involvement in the data analysis or manuscript writing/revision. Additionally, representatives of databases showing interest in collaboration are invited to fill in the online form provided by the ReSurveyEurope Board, which will be evaluated on individual request basis.

- Eligibility of the applicant to receive EVA or ReSurveyEurope data. Specify to which EVA or ReSurveyEurope database the applicant has contributed; if the applicant is not the custodian or deputy custodian of an EVA or ReSurveyEurope database, give a name of a custodian or deputy custodian who supports this data request.

Koenraad Van Meerbeek contributed to the BE_0001 database of ResurveyEurope

- I agree with the terms of EVA Data Property and Governance Rules as approved on 26 May 2012 (http://euroveg.org/download/eva-rules.pdf).
- If I ask for ReSurveyEurope data, I agree with the terms of ReSurveyEurope Data Property and Governance Rules as approved on 6 April 2022 (http://euroveg.org/download/resurveyeurope-rules.pdf).
- In any result obtained based on EVA core data (non-repeated vegetation surveys), I will cite the EVA report article (Chytrý et al. 2016; https://doi.org/10.1111/avsc.12191). In any result obtained based on the ReSurveyEurope data (repeated vegetation surveys), I will cite the ReSurveyEurope report article as soon as it is published. In addition, I will cite individual source databases used in my project (if possible, in the list of References; if not possible, at least as a list of databases in the electronic supplementary material).
- If I ask for the plant trait data from TRY, I agree to invite to my project the TRY data contributors following the list received from the EVA database manager.

Leuven, Belgium, 22nd of May 2025

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