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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- Applicant's institutional address:

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- Project title:

  Assessing the effect of non-native species on European native biodiversity and ecosystem functioning throughout time

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

  ReSurveyEurope

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

  Alien species have long been considered detrimental to native biodiversity and ecosystems by both the general and scientific community (Hulme *et al.*, 2013). Indeed, some alien species can become invasive and have a large impact on native species assemblages and ecosystems, although this generally only applies to 10% of all non-native species (IPBES, 2016). Nevertheless, research has almost exclusively been focussing on this relatively small proportion of alien species with a high impact on the environment, thereby omitting the many (un)intentional introductions in the recent past that did not result in invasions (Hulme *et al.*, 2013). As the relative number of alien species is expected to keep rising due to globalization and climate change (Seebens *et al.*, 2017), thereby leading to the formation of so-called 'novel ecosystems' (Hobbs *et al.*, 2006), it becomes increasingly important to close this research bias and study the effect of all non-native species on biodiversity and ecosystem functioning (Schlaepfer *et al.*, 2011). Besides a current study using spatial data (EVA request 171, 2023-01-02), we want to assess the temporal trends in non-native species' presence and abundance in Europe, evaluate their impact on native plants and infer changes in ecosystem functioning.

In a first step, we intend to study the shift in non-native species over time. In addition to a direct comparison of their abundance and frequency between the times of observation (Thomas & Palmer, 2015), we plan to utilize generalised linear mixed models (GLMMs) with the presence and abundance of non-native species in European vegetation plots as response variables to study their shift over time (Rojas-Sandoval *et al.*, 2022). Predictor variables will include time between observations, environmental and disturbance variables (fixed factors), and year of observation and plot ID as random variables. Similarly, we will assess the impact on native plant richness and abundance using GLMMs and the presence or abundance of alien species as an additional explanatory variable. In addition, the data allows us to study whether native biodiversity can act as a buffer against alien plant invasions (Delvaux *et al.*, 2023). Later, we plan to build the multidimensional trait space per plot and evaluate its relative change over time (Guillerme *et al.*, 2020; Rojas-Sandoval *et al.*, 2022), as well as look at the position of alien species in this trait space (Ordonez & Olff, 2013). The latter analysis will allow us to infer information on the pathway of introduction (Darwin's naturalization versus preadaptation hypotheses; Darwin, 1859) and assess the difference in traits between alien and native species.

Overall, this study will increase our understanding of the temporal impact of alien species on a European scale, which is crucial to optimally allocate resources to combat invasive species while benefitting from the positive impact other alien species might have on future biodiversity and ecosystem functioning (Kumschick *et al.*, 2014). This study is framed within the ERC-funded project FutureNature, addressing assisted migration as a means to ensure ecosystem functioning in future ecosystems under climate change.

Hulme, P. E., Pyšek, P., Jarošík, V., Pergl, J., Schaffner, U., & Vilà, M. (2013). Bias and error in understanding plant invasion impacts. Trends in ecology & evolution, 28(4), 212–218. https://doi.org/10.1016/j.tree.2012.10.010

IPBES. (2023). Thematic Assessment Report on Invasive Alien Species and their Control of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Roy, H. E., Pauchard, A., Stoett, P., and Renard Truong, T. (eds.). IPBES secretariat, Bonn, Germany. https://doi.org/10.5281/zenodo.7430682

Seebens, H., Blackburn, T. M., Dyer, E. E., Genovesi, P., Hulme, P. E., Jeschke, J. M., Pagad, S., Pyšek, P., Winter, M., Arianoutsou, M., Bacher, S., Blasius, B., Brundu, G., Capinha, C., Celesti-Grapow, L., Dawson, W., Dullinger, S., Fuentes, N., Jäger, H., … Essl, F.. (2017). No saturation in the accumulation of alien species worldwide. Nature Communications, 8(1), 14435. https://doi.org/10.1038/ncomms14435

Hobbs, R. J., Arico, S., Aronson, J., Baron, J. S., Bridgewater, P., Cramer, V. A., Epstein, P. R., Ewel, J. J., Klink, C. A., Lugo, A. E., Norton, D., Ojima, D., Richardson, D. M., Sanderson, E. W., Valladares, F., Vilà, M., Zamora, R., & Zobel, M.. (2006). Novel ecosystems: theoretical and management aspects of the new ecological world order. Global Ecology and Biogeography, 15(1), 1–7. https://doi.org/10.1111/j.1466-822x.2006.00212.x

Schlaepfer, M. A., Sax, D. F., & Olden, J. D. (2011). The potential conservation value of non-native species. Conservation biology : the journal of the Society for Conservation Biology, 25(3), 428–437. https://doi.org/10.1111/j.1523-1739.2010.01646.x

Thomas, C. D., & Palmer, G.. (2015). Non-native plants add to the British flora without negative consequences for native diversity. Proceedings of the National Academy of Sciences, 112(14), 4387–4392. https://doi.org/10.1073/pnas.1423995112

Rojas-Sandoval, J., Ackerman, J. D., Marcano-Vega, H., & Willig, M. R.. (2022). Alien species affect the abundance and richness of native species in tropical forests: The role of adaptive strategies. Ecosphere, 13(12). https://doi.org/10.1002/ecs2.4291

Delavaux, C. S., Crowther, T. W., Zohner, C. M., Robmann, N. M., Lauber, T., van den Hoogen, J., Kuebbing, S., Liang, J., de-Miguel, S., Nabuurs, G. J., Reich, P. B., Abegg, M., Adou Yao, Y. C., Alberti, G., Almeyda Zambrano, A. M., Alvarado, B. V., Alvarez-Dávila, E., Alvarez-Loayza, P., Alves, L. F., Ammer, C., … Maynard, D. S. (2023). Native diversity buffers against severity of non-native tree invasions. Nature, 621(7980), 773–781. https://doi.org/10.1038/s41586-023-06440-7

Guillerme, T., Puttick, M. N., Marcy, A. E., & Weisbecker, V.. (2020). Shifting spaces: Which disparity or dissimilarity measurement best summarize occupancy in multidimensional spaces?. Ecology and Evolution, 10(14), 7261–7275. https://doi.org/10.1002/ece3.6452

Ordonez, A., & Olff, H.. (2013). Do alien plant species profit more from high resource supply than natives? A trait-based analysis. Global Ecology and Biogeography, 22(6), 648–658. https://doi.org/10.1111/geb.12019

Darwin, C.R.. (1859). On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life. London: John Murray. [1st edition].

Kumschick, S., Gaertner, M., Vilà, M., Essl, F., Jeschke, J. M., Pyšek, P., Ricciardi, A., Bacher, S., Blackburn, T. M., Dick, J. T. A., Evans, T., Hulme, P. E., Kühn, I., Mrugała, A., Pergl, J., Rabitsch, W., Richardson, D. M., Sendek, A., & Winter, M.. (2015). Ecological Impacts of Alien Species: Quantification, Scope, Caveats, and Recommendations. Bioscience, 65(1), 55–63. https://doi.org/10.1093/biosci/biu193

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

  Mattijs Raets (Master student), dr. Stef Haesen (co-supervisor), ir. Willem Goossens (co-supervisor) and prof. Koenraad Van Meerbeek (promotor).

- Estimated time of delivery of results (e.g., manuscript submission):

  December 2025

- Geographic area needed (e.g., countries or range of geographic coordinates):

  Europe (all areas included in the ReSurveyEurope 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 kilometre-grid accuracy.

- Vegetation types needed (syntaxa):

  All

- Other data selection criteria:

  None; possible data cleaning will follow, but this is to be decided during the analysis process.

- Envisaged publications:

  Two (2) papers in scientific journals.

- 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.

  Possible deposition of diversity (native and non-native) at the plot level, together with additional plot level information required for the analysis such as climate and disturbance variables.

- 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.

  Yes

- 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: http://iavs.org/Governance/Code-of-Professional-Ethics.aspx). 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.

  Following the guidelines of EVA and ReSurveyEurope, 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), but 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, 30/04/2024

Koenraad Van Meerbeek
Stef Haesen
Willem Goossens