FWO DMP Template - Flemish Standard Data Management Plan

Version KU Leuven

Project supervisors (from application round 2018 onwards) and fellows (from application round 2020 onwards) will, upon being awarded their project or fellowship, be invited to develop their answers to the data management related questions into a DMP. The FWO expects a **completed DMP no later than 6 months after the official start date** of the project or fellowship. The DMP should not be submitted to FWO but to the research co-ordination office of the host institute; FWO may request the DMP in a random check.

At the end of the project, the **final version of the DMP** has to be added to the final report of the project; this should be submitted to FWO by the supervisor-spokesperson through FWO's e-portal. This DMP may of course have been updated since its first version. The DMP is an element in the final evaluation of the project by the relevant expert panel. Both the DMP submitted within the first 6 months after the start date and the final DMP may use this template.

The DMP template used by the Research Foundation Flanders (FWO) corresponds with the Flemish Standard Data Management Plan. This Flemish Standard DMP was developed by the Flemish Research Data Network (FRDN) Task Force DMP which comprises representatives of all Flemish funders and research institutions. This is a standardized DMP template based on the previous FWO template that contains the core requirements for data management planning. To increase understanding and facilitate completion of the DMP, a standardized **glossary** of definitions and abbreviations is available via the following link.

1. General Project Information	
Name Grant Holder & ORCID	**Hans Jacquemyn 0000-0001-9600-5794**
Contributor name(s) (+ ORCID) & roles	Hans Jacquemyn 0000-0001-9600-5794 – main supervisor Olivia Bernhardsson 0009-0005-5177-1862 – PhD student working on the project
Project number [1] & title	G0L2122N Improving the functional connectivity of grassland networks for plant-pollinator interactions
Funder(s) GrantID [2]	FWO ERA-NET
Affiliation(s)	☑ KU Leuven ☐ Universiteit Antwerpen ☐ Universiteit Gent ☐ Universiteit Hasselt ☐ Vrije Universiteit Brussel ☐ Other: ROR identifier KU Leuven: 05f950310

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[1] "Project number" refers to the institutional project number. This question is optional. Applicants can only provide one project number.

[2] Funder(s) GrantID refers to the number of the DMP at the funder(s), here one can specify multiple GrantIDs if multiple funding sources were used.

Please provide a short project description	Loss in the area and connectivity of natural and semi-natural habitats in Europe over the last hundred years has placed not only numerous species under threat, but is also jeopardizing interactions between species crucial for maintaining important ecosystem functions and services, such as pollination. Furthermore, with nearly 90 % of flowering plants depending on animal pollinators, loss of pollination interactions may in turn significantly intensify the loss of wild plant species. FuncNet aims to improve our understanding of the effects of the connectivity and management of semi-natural grasslands – hotspots of European biodiversity – on various aspects of plant-pollinator interactions in European agricultural landscapes. The major aims of this project are: 1) to examine the role of spatio-temporal changes of grassland area and connectivity on plants and pollinators in remnant grasslands and other marginal grassland-like habitats of European rural landscapes. 2) to assess the resilience of plant-pollinator networks in relation to habitat connectivity. 3) to explore the genetic diversity, demography and individual fitness of insect-pollinated plants in response to landscape connectivity and related pollination events. 4) to map land-users' and conservation practitioners' perspectives of managing landscapes in favour of supporting plant-pollinator networks. 5) to provide recommendations to conservation practitioners, policy-makers and land-managers about the optimal planning and management strategies of agro-ecosystems in order to safeguard resilient plant-pollinator communities.

2. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data [3].

Dataset Name	Description	New or Reused	Digital or Physical	*ONLY FOR DIGITAL DATA* Digital Data Type	*ONLY FOR DIGITAL DATA* Digital Data Format	*ONLY FOR DIGITAL DATA* Digital Data Volume (MB, GB, TB)	*ONLY FOR PHYSICAL DATA* Physical Volume
Leaf collection	Leaves to be used for genomic analyses	☒ Generate new data ☐ Reuse existing data	☐ Digital ☒ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:		☐ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	One box of leaf samples (600 samples)
Insect collection	Insects to be used for pollen metabarcoding	☐ Generate new data ☐ Reuse existing data	☐ Digital ☒ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:		☐ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	Several boxes of tubes with insects stored on ethanol (> 1000 specimens)
Digital maps	Digital maps extracted from existing databases	☐ Generate new data ☒ Reuse existing data	☒ Digital ☐ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical	.shp .shx .dbf	☒ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB	

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[3] Add rows for each dataset you want to describe.

				Textual Model Software ☒ Other: digital maps		☐ > 5 TB ☐ NA	
Pollen collections	Pollen samples extracted from insects	☒ Generate new data ☐ Reuse existing data	☐ Digital ☒ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:		☒ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	Several boxes of tubes with pollen stored on ethanol
DNA extracts	DNA extracted from pollen	☒ Generate new data ☐ Reuse existing data	☐ Digital ☒ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:		☒ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	Eppendorf tubes with DNA extracts
R scripts	R scripts used to analyse the data	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☒ Software ☐ Other:	.R	☒ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	

Seed collection	Seeds collected from individual fruits of several plants per sampled population	☒ Generate new data ☐ Reuse existing data	☐ Digital ☒ Physical	☐ Audiovisual ☐ Images ☐ Sound ☐ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:		☐ < 1 GB ☐ < 100 GB ☐ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	Seeds will be stored in envelops, which will be collected in paper boxes
Sequencing data	Data from RAD sequencing	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Audiovisual ☐ Images ☐ Sound ☒ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:	.fastq .csv .xlsx	☐ < 1 GB ☐ < 100 GB ☒ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	
Pollen metabarcoding data	Data from pollen metabarcoding	☒ Generate new data ☐ Reuse existing data	☒ Digital ☐ Physical	☐ Audiovisual ☐ Images ☐ Sound ☒ Numerical ☐ Textual ☐ Model ☐ Software ☐ Other:	.fastq .csv .xlsx	☐ < 1 GB ☐ < 100 GB ☒ < 1 TB ☐ < 5 TB ☐ > 5 TB ☐ NA	

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type.	Existing data will be extracted from open data repositories (e.g. trait databases such as TRY or European Butterfly Trait Database; Global Biodiversity Information Facility (GBIF) for species based site selection), topo- and geographical (inter)national databases (e.g. Corine Land Cover maps; historical maps from national databases) and (un)published studies (e.g. a database of the citizen science project "Looking for Cowslips"), and DNA reference sequences and genomes (e.g. Barcode of Life Data system and NCDI).
Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.	☐ Yes, human subject data; provide SMEC or EC approval number: ☐ Yes, animal data; provide ECD reference number: ☐ Yes, dual use; provide approval number: ☒ No Additional information:
Will you process personal data[4]? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).	☐ Yes (provide PRET G-number or EC S-number below) ☒ No Additional information:
Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.	☐ Yes ☒ No If yes, please comment:

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[4] See Glossary Flemish Standard Data Management Plan

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements, research collaboration agreements)? If so, please explain to what data they relate and what restrictions are in place.	☐ Yes ☒ No If yes, please explain:
Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain to what data they relate and which restrictions will be asserted.	☐ Yes ☒ No If yes, please explain:

3. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep **data understandable and usable**, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded). *RDM guidance on documentation and metadata*.	1) For each work package, detailed field protocols will be drafted and shared among the project partners. Protocols are stored as .doc files. 2) The research will be performed in multiple countries (Sweden, Estonia, Belgium, Germany and Czech Republic). A uniform code will used across all countries to assign each sample to a particular population, making the data easily accessible to all project partners and ensuring relational links between all species, genetic, genomic, trait, environmental and geographical data within the project's geodatabase. This will also ensure ease of adding data and data curation during the course of the project. 3) Data will be made understandable and usable using extensive metadata (according to the Ecological Metadata Language).

Will a metadata standard be used to make it easier to **find and reuse the data**? If so, please specify which metadata standard will be used. If not, please specify which metadata will be created to make the data easier to find and reuse. *REPOSITORIES COULD ASK TO DELIVER METADATA IN A CERTAIN FORMAT, WITH SPECIFIED ONTOLOGIES AND VOCABULARIES, I.E. STANDARD LISTS WITH UNIQUE IDENTIFIERS.*	☒ Yes ☐ No If yes, please specify (where appropriate per dataset or data type) which metadata standard will be used: We will use the **Ecological Metadata Language** (EML) to make the data easier to find and reuse. If no, please specify (where appropriate per dataset or data type) which metadata will be created:

4. Data Storage & Back-up during the Research Project	
Where will the data be stored? *Consult the interactive KU Leuven storage guide to find the most suitable storage solution for your data.*	☒ Shared network drive (J-drive) ☒ Personal network drive (I-drive) ☒ OneDrive (KU Leuven) ☒ Sharepoint online ☐ Sharepoint on-premis ☐ Large Volume Storage ☐ Digital Vault ☒ Other: Apart from local storage facilities, all data will also be shared within the consortium via an online cloud repository, i.e., the NextCloud service provided by the University of Tartu.

How will the data be backed up? *WHAT STORAGE AND BACKUP PROCEDURES WILL BE IN PLACE TO PREVENT DATA LOSS?*	☒ Standard back-up provided by KU Leuven ICTS for my storage solution ☒ Personal back-ups I make (specify) ☐ Other (specify) Field notes will be transformed into digital transcripts or scans. Digital data will be archived on the researcher's Bitlocker encrypted laptop in password-protected files, on the OneDrive linked to the researcher's KU Leuven account and on secure KU Leuven network drives. Backups are automated daily, ensuring that the digital data will be preserved in such a way that loss or misuse is prevented at all times.
Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.	☒ Yes ☐ No If no, please specify: The lab has sufficient room, closets and refrigerators to conserve the physical data. In case insufficient storage capacities are available, new closets or refrigerators will be provided. The digital data are not expected to exceed the personal storage capacity and the storage capacity of the KU Leuven network drives.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons? *CLEARLY DESCRIBE THE MEASURES (IN TERMS OF PHYSICAL SECURITY, NETWORK SECURITY, AND SECURITY OF COMPUTER SYSTEMS AND FILES) THAT WILL BE TAKEN TO ENSURE THAT STORED AND TRANSFERRED DATA ARE SAFE.* [Guidance on security for research data](#)	Physical data such as leaf and pollen samples will be stored in boxes and subsequently be put in a closet in the office of the researcher hired for the project. This closet will always be locked, with the researchers working on this project being the only persons having access to the data. In this way, these data are effectively preserved and loss or misuse is prevented. DNA data will be stored at -80°C in specifically foreseen refrigerators. Refrigerators are always locked and only accessible to the lab technician and persons working on the project. In this way, they are not accessible to unauthorized persons? Digital data will be archived on the researcher's laptop in different password-protected files, on the OneDrive linked to the researcher's KU Leuven account, and on secure KU Leuven network drives. The laptop of the researcher is encrypted with Bitlocker Drive encryption, making the data inaccessible even if unauthorized persons would obtain the laptop. In addition, the researcher working on the project is the only person who has access to his KU Leuven password-protected OneDrive account. Data stored on KU Leuven drives is encrypted and only accessible by the researcher and promoter of the project.
What are the expected costs for data storage and backup during the research project? How will these costs be covered?	All storage facilities are in place and no extra costs are expected for data storage and backup during the project.

5. Data Preservation after the end of the Research Project

Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...). *Guidance on data preservation*	☒ All data will be preserved for 10 years according to KU Leuven RDM policy ☐ All data will be preserved for 25 years according to CTC recommendations for clinical trials with medicinal products for human use and for clinical experiments on humans ☐ Certain data cannot be kept for 10 years (explain) All collected will be preserved for at least 10 years after the end of the research (in accordance with the KU Leuven RDM policy). Any physical field notes will be photographed/scanned and transcribed into password protected digital documents.
Where will these data be archived (stored and curated for the long-term)? *Dedicated data repositories are often the best place to preserve your data. Data not suitable for preservation in a repository can be stored using a KU Leuven storage solution, consult the interactive KU Leuven storage guide.*	☐ KU Leuven RDR ☐ Large Volume Storage (longterm for large volumes) ☒ Shared network drive (J-drive) ☒ Other (specifiy): Physical data will be stored in closed cabinets available at the lab. DNA samples will be stored at -80°C in locked refrigerators. Digital data will be placed on the One Drive linked to the KU Leuven account of the supervisor and his personal KU Leuven network drive.
What are the expected costs for data preservation during the expected retention period? How will these costs be covered?	There are no expected costs.

6. Data Sharing and Reuse

Will the data (or part of the data) be made available for reuse after/during the project? Please explain per dataset or data type which data will be made available. *Note that 'available' does not necessarily mean that the data set becomes openly available, conditions for access and use may apply. Availability in this question thus entails both open & restricted access. For more information:* [*https://wiki.surfnet.nl/display/standards/info-eu-repo/#infoeurepo-AccessRights*](https://wiki.surfnet.nl/display/standards/info-eu-repo/#infoeurepo-AccessRights)	☒ Yes, as open data ☐ Yes, as embargoed data (temporary restriction) ☐ Yes, as restricted data (upon approval, or institutional access only) ☐ No (closed access) ☐ Other, please specify: All data generated as a result of the project will be made public following the FAIR (Findability, Accessibility, Interoperability, and Reusability) principles. Initially, all sourced and new (spatial, species, genetic, population, trait and environmental) data as well as R-code required to reproduce each individual study will be made public upon acceptance of the associated journal article, either directly with the article or via permanent, open-access data repositories such as Dryad (often free of charge according to journal agreements). R-Code for the whole FuncNet project will be hosted on GitHub. In addition, DNA sequence data from metabarcoding and RAD-Seq analyses will be made available at the European Nucleotide Archive (ENA). Finally, after publication of the project's core publications, the entire geodatabase with an associated open-access data descriptor paper will be published in Scientific Data or Ecology.
If access is restricted, please specify who will be able to access the data and under what conditions.	
Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain per dataset or data type where appropriate.	☐ Yes, privacy aspects ☐ Yes, intellectual property rights ☐ Yes, ethical aspects ☐ Yes, aspects of dual use ☐ Yes, other ☒ No If yes, please specify:

Where will the data be made available? If already known, please provide a repository per dataset or data type.	☐ KU Leuven RDR ☒ Other data repository (specify) ☐ Other (specify) All sourced and new (spatial, species, genetic, population, trait and environmental) data as well as R-code required to reproduce each individual study will be made public upon acceptance of the associated journal article, either directly with the article or via permanent, open-access data repositories such as Dryad (often free of charge according to journal agreements). R-Code for the whole FuncNet project will be hosted on GitHub. In addition, DNA sequence data from metabarcoding and RAD-Seq analyses will be made available at the European Nucleotide Archive (ENA). Finally, after publication of the project's core publications, the entire geodatabase with an associated open-access data descriptor paper will be published in Scientific Data or Ecology.
When will the data be made available?	☒ Upon publication of research results ☐ Specific date (specify) ☐ Other (specify)
Which data usage licenses are you going to provide? If none, please explain why. *A DATA USAGE LICENSE INDICATES WHETHER THE DATA CAN BE REUSED OR NOT AND UNDER WHAT CONDITIONS. IF NO LICENCE IS GRANTED, THE DATA ARE IN A GREY ZONE AND CANNOT BE LEGALLY REUSED. DO NOTE THAT YOU MAY ONLY RELEASE DATA UNDER A LICENCE CHOSEN BY YOURSELF IF IT DOES NOT ALREADY FALL UNDER ANOTHER LICENCE THAT MIGHT PROHIBIT THAT.* *Check the RDR guidance on licences for data and software sources code or consult the License selector tool to help you choose.*	☒ CC-BY 4.0 (data) ☐ Data Transfer Agreement (restricted data) ☐ MIT licence (code) ☐ GNU GPL-3.0 (code) ☐ Other (specify)

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, please provide it here. *INDICATE WHETHER YOU INTEND TO ADD A PERSISTENT AND UNIQUE IDENTIFIER IN ORDER TO IDENTIFY AND RETRIEVE THE DATA.*	☐ Yes, a PID will be added upon deposit in a data repository ☐ My dataset already has a PID ☒ No
What are the expected costs for data sharing? How will these costs be covered?	None

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	The researcher hired on the project (Olivia Bernhardsson) and the main supervisor (Prof. Hans Jacquemyn) will be responsible for the management of the data.
Who will manage data storage and backup during the research project?	The researcher hired on the project (Olivia Bernhardsson) and the main supervisor (Prof. Hans Jacquemyn) will be responsible for storage and backup of the data during the project.
Who will manage data preservation and sharing?	The supervisor (Prof. Hans Jacquemyn) will be responsible for the preservation and sharing of the data after the study is completed.
Who will update and implement this DMP?	The researcher hired on the project (Olivia Bernhardsson) and the main supervisor (Prof. Hans Jacquemyn) will update and implement this Data Management Plan.