

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	Laura Van der Jeucht - 0000-0002-5009-2279
Contributor name(s) (+ ORCID) & roles	Bram Van de Poel – promotor Wim Van den Ende – co-promotor
Project number ¹ & title	1SHAY24N - Using far-red light to steer carbon assimilation and translocation in tomato
Funder(s) GrantID ²	1SHAY24N
Affiliation(s)	<input type="checkbox"/> KU Leuven <input type="checkbox"/> Universiteit Antwerpen <input type="checkbox"/> Universiteit Gent <input type="checkbox"/> Universiteit Hasselt <input type="checkbox"/> Vrije Universiteit Brussel <input type="checkbox"/> Other: ROR identifier KU Leuven: 05f950310
Please provide a short project description	<p>The advancement in LED technology has transformed horticulture, including vegetable production in greenhouses. Besides assimilation LEDs to drive photosynthesis, the introduction of far-red light (730 nm) into greenhouse production is the latest trend. Research has shown that additional far-red lighting, on top of full-LED lighting, of tomato plants leads to a higher yield. Also, fruit have a higher sugar content, making them sweeter. It is known that far-red light activates phytochrome signaling, but not what the downstream responses are related to the plant's sugar metabolism. We postulate that far-red light enhances the yield of tomato plants via 3 mechanisms: altering of plant architecture, direct activation of leaf photosynthesis, and regulation of gene expression related to the sugar metabolism. Our preliminary data has shown that the first mechanism is influenced by far-red light, but the second is not. We will focus our research efforts on the third mechanism. We will do so by analyzing gene expression through RNAseq, creating knockouts of identified key genes, and performing far-red trials to monitor physiology (plant architecture) and biochemistry (sugar levels and transport). This approach will enable us to unravel the mechanism how far-red light steers carbon assimilation and translocation via phytochrome signaling in tomato. This knowledge can help to further increase yield in a sustainable way and support high-tech innovations in horticulture.</p>

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.

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.

WP1: Effect of far-red light on tomato sugar metabolism

Description	New or Reused	Digital or Physical	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA
			Digital Data Type	Digital Data Format	Digital Data Volume (MB, GB, TB)
Sucrose synthase: the absorbance of samples is compared to a sucrose standard curve, and this allows for the calculation of the activity of sucrose synthase.	Generate new data	Digital	Numerical	.xlsx .csv	< 1 GB
Phloem sap: HPLC chromatogram peak areas, used to calculate sucrose concentration in sample	Generate new data	Digital	Numerical	.xlsx .csv	< 1 GB

WP2: Revealing the role of the phytochromes

Description	New or Reused	Digital or Physical	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA
			Digital Data Type	Digital Data Format	Digital Data Volume (MB, GB, TB)
CRISPR/Cas9: sequencing datasets	Generate new data	Digital	Numerical	.fastq	< 1 TB
CRISPR/Cas9: analysis sequencing data	Generate new data	Digital	Numerical + textual	.xlsx .docx	< 1 GB
Plants' response to far-red experimental data	Generate new data	Digital	Numerical	.xlsx	< 1 GB

³ Add rows for each dataset you want to describe.

(length increase, chlorophyll fluorescence, petiole angles & length, canopy cover, source leaf surface area, photosynthesis & transpiration rate, stomatal conductance)				.csv	
Images of plants to calculate canopy cover, petiole length, and source leaf surface area	Generate new data	Digital	Images	.jpg	< 1 GB
HPLC chromatogram peak areas, used to calculate glucose, fructose and sucrose concentrations in plant tissue	Generate new data	Digital	Numerical	.xlsx .csv	< 1 GB

				ONLY FOR PHYSICAL DATA
Description	New or Reused	Digital or Physical	Physical Volume	
CRISPR/Cas9: knockout lines of the different phytochromes	Generate new data	Physical	Up to 20 plants + up to 1000 seeds	
CRISPR/Cas9: vector DNA	Generate new data	Physical	1 box in -20	

WP3: Uncovering far-red controlled molecular pathway

			ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA
Description	New or Reused	Digital or Physical	Digital Data Type	Digital Data Format	Digital Data Volume (MB, GB, TB)
RNA-sequencing data raw	Generate new data	Digital	Numerical, textual	.fastq.gz	< 1 TB
RNA-sequencing data processed	Generate new data	Digital	Numerical, textual	.bam	< 1 TB
Data analysis	Generate new data	Digital	Numerical, textual	.rmd, .html, .docx, .png, .txt, .xlsx	< 1 TB

CRISPR/Cas9: sequencing datasets	Generate new data	Digital	Numerical	.fastq	< 1 TB
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			ONLY FOR PHYSICAL DATA
Description	New or Reused	Digital or Physical	Physical Volume
CRISPR/Cas9: knockout lines of selected sugar metabolism genes	Generate new data	Physical	Up to 20 plants + up to 1000 seeds
CRISPR/Cas9: vector DNA	Generate new data	Physical	1 box in -20
Reporter lines: plant material and seeds	Generate new data	Physical	Up to 20 plants + up to 1000 seeds

WP4: Validation of findings for yield increase

			ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA
Description	New or Reused	Digital or Physical	Digital Data Type	Digital Data Format	Digital Data Volume (MB, GB, TB)
Plants' response to far-red experimental data (length increase, chlorophyll fluorescence, petiole angles & length, canopy cover, source leaf surface area, photosynthesis & transpiration rate, stomatal conductance)	Generate new data	Digital	Numerical	.xlsx .csv	< 1 GB
Images of plants to calculate canopy cover, petiole length, and source leaf surface area	Generate new data	Digital	Images	.jpg	< 1 GB
HPLC chromatogram peak areas, used to calculate glucose, fructose and sucrose concentrations in plant tissue	Generate new data	Digital	Numerical	.xlsx .csv	< 1 GB

GUIDANCE:

The data description forms the basis of your entire DMP, so make sure it is detailed and complete. It includes digital and physical data and encompasses the whole spectrum ranging from raw data to processed and analysed data including analysis scripts and code. Physical data are all materials that need proper management because they are valuable, difficult to replace and/or ethical issues are associated. Materials that are not considered data in an RDM context include your own manuscripts, theses and presentations; documentation is an integral part of your datasets and should be described under documentation/metadata.

[RDM Guidance on data](#)

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.	/
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.	<input type="checkbox"/> Yes, human subject data; provide SMEC or EC approval number: <input type="checkbox"/> Yes, animal data; provide ECD reference number: <input type="checkbox"/> Yes, dual use; provide approval number: <input checked="" type="checkbox"/> 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).	<input type="checkbox"/> Yes (provide PRET G-number or EC S-number below) <input checked="" type="checkbox"/> 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.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please comment:
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.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please explain:

⁴ See Glossary Flemish Standard Data Management Plan

<p>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.</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please explain:</p>
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3. Documentation and Metadata	
<p>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).</p> <p><i>RDM guidance on documentation and metadata.</i></p>	<p>Experimental work will be documented in protocols and lab books. README.txt files will be provided for raw datafiles, elaborating on the origin of the dataset and describing the variables. Physical data (plant tissue/extracts) will be stored and labeled appropriately.</p>
<p>Will a metadata standard be used to make it easier to find and reuse the data?</p> <p>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.</p> <p><i>REPOSITORIES COULD ASK TO DELIVER METADATA IN A CERTAIN FORMAT, WITH SPECIFIED ONTOLOGIES AND VOCABULARIES, I.E. STANDARD LISTS WITH UNIQUE IDENTIFIERS.</i></p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please specify (where appropriate per dataset or data type) which metadata standard will be used:</p> <p>If no, please specify (where appropriate per dataset or data type) which metadata will be created:</p>

4. Data Storage & Back-up during the Research Project

<p>Where will the data be stored?</p> <p><i>Consult the interactive KU Leuven storage guide to find the most suitable storage solution for your data.</i></p>	<p> <input checked="" type="checkbox"/> Shared network drive (J-drive) <input checked="" type="checkbox"/> Personal network drive (I-drive) <input checked="" type="checkbox"/> OneDrive (KU Leuven) <input type="checkbox"/> Sharepoint online <input type="checkbox"/> Sharepoint on-premis <input type="checkbox"/> Large Volume Storage <input type="checkbox"/> Digital Vault <input type="checkbox"/> Other: </p>
<p>How will the data be backed up?</p> <p><i>WHAT STORAGE AND BACKUP PROCEDURES WILL BE IN PLACE TO PREVENT DATA LOSS?</i></p>	<p> <input checked="" type="checkbox"/> Standard back-up provided by KU Leuven ICTS for my storage solution <input type="checkbox"/> Personal back-ups I make (specify) <input type="checkbox"/> Other (specify) </p>
<p>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.</p>	<p> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </p> <p>If no, please specify:</p> <p>The lab currently uses 315 MB of the available 0.99 TB on the server. Physical data (crushed plant material, RNA...) will be stored on silica at room temperature for dry samples and in the -80 °C freezer for other samples. The lab has sufficient space in the -80 °C freezer. The -80 °C freezer is equipped with an automated temperature alarm, provided by the KU Leuven central dispatch team. A backup contact list is provided in case the -80 °C goes into alarm.</p>

<p>How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?</p> <p><i>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.</i></p> <p>Guidance on security for research data</p>	<p>The KU Leuven drives are password protected through the central KU Leuven login. KU Leuven obliges users to update passwords regularly. The network drive of the shared folder is secured by the ICTS service of KU Leuven with a mirror copy. Only specific lab members will have access to the shared folder. Unauthorized persons do not have access to this system.</p>
<p>What are the expected costs for data storage and backup during the research project? How will these costs be covered?</p>	<p>We don't expect extra cost for data storage. But in case the lab does not have enough storage room, the PI has budget to buy more.</p>

5. Data Preservation after the end of the Research Project	
<p>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...).</p> <p>Guidance on data preservation</p>	<p><input checked="" type="checkbox"/> All data will be preserved for 10 years according to KU Leuven RDM policy</p> <p><input type="checkbox"/> 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</p> <p><input type="checkbox"/> Certain data cannot be kept for 10 years (explain)</p>

<p>Where will these data be archived (stored and curated for the long-term)?</p> <p><i>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.</i></p>	<p> <input type="checkbox"/> KU Leuven RDR <input type="checkbox"/> Large Volume Storage (longterm for large volumes) <input type="checkbox"/> Shared network drive (J-drive) <input checked="" type="checkbox"/> Other (specify): University's central service, -80°C freezer and seedstock (4°C). </p>
<p>What are the expected costs for data preservation during the expected retention period? How will these costs be covered?</p>	<p>We don't expect extra costs. In case there will be, the PI had budget for this.</p>

6. Data Sharing and Reuse

<p>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.</p> <p><i>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/#INFOEU-ACCESSRIGHTS</i></p>	<p> <input type="checkbox"/> Yes, as open data <input type="checkbox"/> Yes, as embargoed data (temporary restriction) <input type="checkbox"/> Yes, as restricted data (upon approval, or institutional access only) <input type="checkbox"/> No (closed access) <input checked="" type="checkbox"/> Other, please specify: We aim to publish all data and make it available for requests afterwards. Until publication the data will be protected. </p>
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<p>If access is restricted, please specify who will be able to access the data and under what conditions.</p>	<p>All lab members will have access to the data. The published data will be available upon request for non-lab members.</p>
<p>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.</p>	<p> <input type="checkbox"/> Yes, privacy aspects <input type="checkbox"/> Yes, intellectual property rights <input type="checkbox"/> Yes, ethical aspects <input type="checkbox"/> Yes, aspects of dual use <input type="checkbox"/> Yes, other <input checked="" type="checkbox"/> No </p> <p>If yes, please specify:</p>
<p>Where will the data be made available? If already known, please provide a repository per dataset or data type.</p>	<p> <input type="checkbox"/> KU Leuven RDR <input type="checkbox"/> Other data repository (specify) <input checked="" type="checkbox"/> Other (specify) Upon request by mail. </p>
<p>When will the data be made available?</p>	<p> <input checked="" type="checkbox"/> Upon publication of research results <input type="checkbox"/> Specific date (specify) <input type="checkbox"/> Other (specify) </p>

<p>Which data usage licenses are you going to provide? If none, please explain why.</p> <p><i>A DATA USAGE LICENSE INDICATES WHETHER THE DATA CAN BE REUSED OR NOT AND UNDER WHAT CONDITIONS. IF NO LICENSE IS GRANTED, THE DATA ARE IN A GREY ZONE AND CANNOT BE LEGALLY REUSED. DO NOTE THAT YOU MAY ONLY RELEASE DATA UNDER A LICENSE CHOSEN BY YOURSELF IF IT DOES NOT ALREADY FALL UNDER ANOTHER LICENSE THAT MIGHT PROHIBIT THAT.</i></p> <p>Check the RDR guidance on licences for data and software sources code or consult the License selector tool to help you choose.</p>	<p><input checked="" type="checkbox"/> CC-BY 4.0 (data)</p> <p><input type="checkbox"/> Data Transfer Agreement (restricted data)</p> <p><input type="checkbox"/> MIT licence (code)</p> <p><input type="checkbox"/> GNU GPL-3.0 (code)</p> <p><input type="checkbox"/> Other (specify)</p>
<p>Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, please provide it here.</p> <p><i>INDICATE WHETHER YOU INTEND TO ADD A PERSISTENT AND UNIQUE IDENTIFIER IN ORDER TO IDENTIFY AND RETRIEVE THE DATA.</i></p>	<p><input type="checkbox"/> Yes, a PID will be added upon deposit in a data repository</p> <p><input type="checkbox"/> My dataset already has a PID</p> <p><input checked="" type="checkbox"/> No</p>
<p>What are the expected costs for data sharing? How will these costs be covered?</p>	<p>Data sharing is organized by the KU Leuven and is free of cost for the lab.</p>

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	Laura Van der Jeucht
Who will manage data storage and backup during the research project?	Laura Van der Jeucht
Who will manage data preservation and sharing?	Bram Van de Poel
Who will update and implement this DMP?	Bram Van de Poel

