SynBioS: Synergistic biocontrol technologies for disease and pest management in strawberry

A Data Management Plan created using DMPonline.be

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Project abstract:

Primary crop production is facing serious challenges with respect to climate change, sustainability, food security and socio-economic profitability. With an average yield loss of 23%, plant diseases and pests are an important threat to global food security. Chemical plant protection products (PPPs) are widely used to control diseases and pests. Due to their environmental impact and the resistance development of pathogens and pests against several PPPs, their application becomes more and more restricted. The European Farm to Fork strategy envisages to reduce the overall use and risk of chemical PPPs with 50% by 2030. To achieve this ambitious goal, alternative and highly effective management strategies, based on innovative technologies are needed. The SynBioS consortium aims to develop an innovative concept of synergy, where biocontrol technologies with different modes of action are being combined. To target insects, we will develop a root-associated microbe based approach to enhance plant resistance, and an indirect approach based on phages, targeting bacterial symbionts of the insects. To target fungi and bacteria, SynBioS will explore the composition and functionalities of the phyllosphere microbiome and use this data to develop a synthetic microbial community specifically tailored to tackle diseases. The different approaches will be combined and evaluated for potential synergies. Finally, to strongly increase the valorization potential of the SynBioS results, we will analyze the social acceptability and economic feasibility of the innovative biocontrol strategies. The SynBioS project will focus on strawberry as a first proof-of-concept and against its most important airborne diseases and pests. However, we expect that the groundbreaking technology-driven toolbox, developed by the SynBioS consortium, can be extrapolated to other crop production systems and will lead to a breakthrough in the efficacy and adoption rates of biological control.

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Application DMP

Questionnaire

Describe the datatypes (surveys, sequences, manuscripts, objects …) the research will collect and/or generate and /or (re)use. (use up to 700 characters)

KU Leuven
Origin: lab experiments and other data (WP1, 2, 3: KUL)

- Type: sample processing and laboratory records
- Format:
  - Logging will be done using physical lab notebooks. Notes will be handwritten, typed when necessary and digitized as scans or photos when key data collected.
  - Digital data will be stored on the OneDrive system provided by KU Leuven. KU Leuven ICTS provides standard back-up.
  - Transcriptome data: raw and processed data stored on KU Leuven server (see above)
- Estimated volume: up to 1 TB

Origin: collected phages (WP1)

- Type: phages
- Format: phages will be stored in glycerol at -80C

University of Antwerp (UA)/KU Leuven (KUL):
Origin: collected samples from strawberry plants (WP2: UA/KUL)

- Type: microbial DNA, microbial DNA sequences and microbial isolates
- Format: microbial DNA stored at -20C, organisms stored in glycerol at -80C, sequences stored as fastq files (contian DNA sequencing data and information on their quality)
- Estimated volume: up to 2x40 Gb

Origin: questionnaires filled in by strawberry farmers (commercial and hobbyist) (WP2: UA/KUL)

- Type: data on the weather conditions, cultivar, cultivation strategy, crop protection used (biological and non-biological), information on the farm (address, name of the participant), substrate used, soil type, temperature control.
- Format: .xlsx file
- Estimated volume: up to 2x2 Gb

Origin: lab experiments and other data (WP2: UA)

- Type: sample processing and laboratory records
- Format: logging will be done using physical lab notebooks. Notes will be handwritten, typed when necessary and digitized as scans or photos when key data collected. Individual measurements will be entered into an excel file (.xlsx and .csv) and stored on protected Sharepoint file system of the lab (on the server of UAntwerpen).
- Estimated volume: up to 20 Gb

ILVO:
Origin: T4.1 In-depth interviews with strawberry food chain actors (project partners, advisory committee and other)

- Type: information on opportunities and barriers for implementation of alternative crop protection products and the needs and expectations for chemically synthesised and biological crop protection products
- Format: mp3, mp4, docx, PDF
- Estimated volume: up to 100 GB

Origin: T4.1 Focus groups with strawberry growers (commercial) or T4.2 project partners and the advisory committee

- Type: feedback on the current and alternative system maps
- Format: mp3, PDF, docx
- Estimated volume: up to 1 GB

Origin: T4.1 - Economic analysis

- Type: Dataset based on internet research, literature study, interviews and existing datasets (LMN, Statbel, annual reports, ...)
- Format: xlsx
- Estimated volume: up to 1 GB

Origin: T4.2 Co-creation workshop with representative stakeholders of producers and distributors of crop protection products and strawberry growers (commercial)

- Type: cocreation of an alternative, innovative system map and current and alternative business models

- Format: mp3, PDF, docx
- Estimated volume: up to 1 GB

Origin: T4.3 Interviews with strawberry advisors

- Type: information on product features that need special attention during communication with users of crop protection products and information on learning-method preferences and experiences
- Format: mp3, mp4, docx, PDF
- Estimated volume: up to 100 GB

Origin: T4.3 Large-scale survey with strawberry growers (commercial)

- Type: information on the demands, preferences and expectations on knowledge-transfer and consultation concerning the use of crop protection products
- Format: csv, xlsx
- Estimated volume: up to 2 GB

Origin: T4.3 Feedback-interview with participants of the workshop (i.e. strawberry growers (commercial))

- Type: feedback on the developed learning strategy
- Format: mp3, mp4, docx, PDF
- Estimated volume: up to 100 GB

Specify in which way the following provisions are in place in order to preserve the data during and at least 5 years after the end of the research? Motivate your answer. (use up to 700 characters)

Designation of responsible person (If already designated, please fill in his/her name.)

- **KU Leuven:** During data collection Katto Macharis, Pauline Verhage, Dr. Liese Vlasselaer, Dr. Sara Van Hee, Dr. Jeroen Wagemans will be the main persons responsible for data collection and preservation. Prof. De Coninck, Prof. Lievens, Prof. Lavigne (Principal Investigator) are co-responsible for the data storage and KU Leuven ICT is responsible for backup of the server.
- **University of Antwerp:** During data collection Brianne Newman will be the main person responsible for data collection and preservation. Dr. Stijn Wittouck and Dr. Sarah Lebeer (Principal Investigator) are co-responsible for the data storage and backup of the server and data and its preservative.
- **ILVO:** During data collection, Kaat Peeters will be the main person responsible for data collection and preservation in cooperation with Prof. dr. Fleur Marchand (project leader), Jef Van Meensel (project mentor), Dakerlia Claeys (Data officer ILVO Social Sciences department), Elien Dewitte (ILVO datamanager) and Bart Ampe (Data protection officer of ILVO). The ILVO IT-department is responsible for the back-up of the server.

Storage capacity/repository (during the research and after the research)

- **KU Leuven:** Electronic data will be stored in a dedicated SynBioS folder on a secured KU Leuven server with limited digital access for KU Leuven personnel involved in the SynBioS project. Each lab will have his own SynBioS folder with all collected data. Final data for the different experiments will be collected in a shared SynBioS folder on the KU Leuven server to which University of Antwerp and ILVO will have access
- **University of Antwerp:** The collected data will be stored on the password-protected server of the University of Antwerp managed by UAntwerp's ICT department with regular automatic backups. Microbiome and other data will be stored, and protected on the server of the research group. Upon open-access publishing, the data will be made available via an Open Access Repository such as ENA and metadata will be published on IRUA.
- **ILVO:** Electronic data will be stored in a dedicated SynBioS folder on a secured server on ILVO with limited physical and digital access for ILVO personnel involved in the SynBioS project. Data is daily backed up by ILVO-ICT department.

What's the reason why you wish to deviate from the principle of preservation of data and of the minimum preservation term of 5 years? (max. 700 characters)

We don't anticipate deviating from the minimum 5 year preservation term.

Are there issues concerning research data indicated in the ethics questionnaire of this application form? Which specific security measures do those data require? (use up to 700 characters)

We do not anticipate ethical issues arising.

Which other issues related to the data management are relevant to mention? (use up to 700 characters)

Consent forms will be used to inform farmer participants of the study and what is expected of them and what will be done with their data.

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FWO DMP (Flemish Standard DMP)

Project Information

Antigoon project ID

48638

1. 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.

				Only for digital data	Only for digital data	Only for digital data	Only for physical data
Dataset Name	Description	New or reused	Digital or Physical	Digital Data Type	Digital Data format	Digital data volume (MB/GB/TB)	Physical volume
		Please choose from the following options: • Generate new data • Reuse existing data	*Please choose from the following options:* • Digital • Physical	*Please choose from the following options:* • Observational • Experimental • Compiled/aggregated data • Simulation data • Software • Other • NA	*Please choose from the following options:* • .por, .xml, .tab, .csv,.pdf, .txt, .rtf, .dwg, .gml, … • NA	*Please choose from the following options:* • <100MB • <1GB • <100GB • <1TB • <5TB • <10TB • <50TB • >50TB • NA	
KU Leuven/Antwerp/ILVO							
SynBioS - Methods and protocols	Associated data	Generate new data and reuse existing data	Digital	Textual	.doc, .pdf, .xls	< 1GB	
SynBioS - Communicative data	Scientific reports, presentations, papers, theses, media	Generate new data	Digital	Textual, audiovisual	.doc, .pdf, .ppt, .mp4	< 100GB	
KU Leuven							
T1.1/T1.2/T1.3/T3.2 - SynBioS experimental data on plants	Disease assays with pests and biocontrol organisms/phages	Generate new data	Digital	Observational and experimental	.doc, .txt, .xls, .jpeg, .cvs, .png	< 1GB	
T1.1 SynBioS - RNA sequencing data	Transcriptome data based on Illumina sequencing	Generate new data	Digital	Experimental and computational	.fastq, .fasta, .gff, .gtf, .bam	<100GB	
T1.2/T2.2 Phages	Phage collection for symbionts of *Myzus persicae* *Halyporpha halys.* Phage collection for *Xanthomonas fragariae*	Generate new data	Physical				Maximum 20 phages/bacterium stored in boxes at 4°C

T2.1/T3.1 SynBioS experimental data on plants	Disease assays with fungi/bacteria and selected microorganisms	Generate new data	Digital	Observational and experimental	doc, .txt, .xls, .jpeg, .cvs, .png	< 1Gb	
University of Antwerp/KU Leuven							
T2.1 - SynBioS microbiome sequencing	Strawberry phyllosphere raw and processed deep amplicon and shotgun sequences	Generate new data	Digital	Observational, experimental, computational	.pdf, .fastq., .csv, .xlsx, .txt	<100 Gb	NA
T2.1 - SynBioS microbial isolates	Microbial isolates collected from strawberry plants around Flanders	Generate new data	Physical				300-500 isolates (each contains about 1 mL each). Bacterial isolates UA; fungal isolates KUL
T2.1 - SynBioS Bacterial sequencing data	Raw and processed data of bacterial whole genome sequences	Generate new data	Digital	Computational, compiled/aggregated	.fastq, .fasta, .gb, .cvs	< 100Gb	
T2.1 - SynBioS metadata	Information on the samples collected from strawberry plants	Generate new data	Digital	Observational	.xlsx, .csv, .txt, .jpeg	<100 Gb	NA
T2.1 - SynBioS experimental data on microorganisms	Data generated during experiments on individual bacterial and fungal isolates from strawberry plants	Generate new data	Digital	Experimental, compiled/aggregated	.csv, .xlsx, .txt, .jpeg, .png	< 100 Gb	NA
ILVO							
T4.1 - SynBioS In-depth interviews	Recordings of interviews, Transcibed interviews, Pseudonimised interviews, Reports and informed consents	Generate new data	Digital & Physical	Observational	mp3, mp4, docx, PDF	< 100 Gb	max. 1 informed consent per interviewee
T4.1 - SynBioS Focus groups	Recordings of focus groups, Reports and informed consents	Generate new data	Digital & physical	Obervational	mp3, PDF, docx	< 1 Gb	max. 1 informed consent per participant
T4.1 - SynBioS Economic analysis	Dataset based on internet research, literature study, interviews and existing datasets (LMN, Statbel, annual reports, ...)	Reuse existing data	Digital	Computational,Compiled/aggregated	.xlsx	< 1 Gb	NA
T4.1 - SynBioS Metadata	Metadata of all data generated in T4.1	Generate new data	Digital	NA	.csv	< 1 Gb	NA
T4.1 - SynBioS README	All background information on data generated in T4.1	Generate new data	Digital	NA	.txt	< 1 Gb	NA

T4.2 - SynBioS Co-creation workshops	Recordings of workshops, Reports and informed consents	Generate new data	Digital & physical	Obervational	mp3, PDF, docx	< 1 Gb	max. 1 informed consent per participant
T4.2 - SynBioS Focus groups	Recordings of focus groups, Reports and informed consents	Generate new data	Digital & Physical	Observational	mp3, PDF, docx	< 1 Gb	max. 1 informed consent per participant
T4.2 - SynBioS Metadata	Metadata of all data generated in T4.2	Generate new data	Digital	NA	csv	< 1 Gb	NA
T4.2 - SynBioS README	All background information on data generated in T4.2	Generate new data	Digital	NA	txt	< 1 Gb	NA
T4.3 - SynBioS Interviews strawberry advisors	Recordings of focus groups, Reports and informed consents	Generate new data	Digital & Physical	Observational	mp3, mp4, docx, PDF	< 100 Gb	max. 1 informed consent per interviewee
T4.3 - SynBioS Large-scale survey	Data generated during a large-scale survey with strawberry growers	Generate new data	Digital	Experimental	.csv	< 100 Gb	NA
T4.3 - SynBioS Feedback-interviews	Reports and informed consents	Generate new data	Digital & Physical	Obervational	mp3, mp4, docx, PDF	< 100 Gb	max. 1 informed consent per interviewee
T4.3 - SynBioS Metadata	Metadata of all data generated in T4.3	Generate new data	Digital	NA	csv	< 1 Gb	NA
T4.3 - SynBioS README	All background information on data generated in T4.3	Generate new data	Digital	NA	txt	< 1 Gb	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:

KU Leuven: does not anticipate reusing existing data.

University of Antwerp: do not anticipate reusing existing data.

ILVO: For the Economic analysis ILVO will analyse

1) pseudonimised LMN- data (Landbouwmonitoringsnetwerk - data = Flemish farm accountancy data network (FADN)) managed by the Agency for Agriculture and Fisheries . This data exchange between ILVO and the Agency for Agriculture and Fisheries was approved by the Vlaamse Toezichtcommissie (VTC). (For more information see: http://vtc.corve.be/docs/beraadslagingen/VTC_beraadslaging_2012_07.pdf). For anonymous data based on Agricultural Monitoring Network see Landbouwmonitoringsnetwerk | Landbouw & Visserij (vlaanderen.be)

2) Anonymised data of farm and horticultural holdings managed by Statistics Belgium Farm and horticultural holdings | Statbel (fgov.be)

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? Describe these issues in the comment section. Please refer to specific datasets or data types when appropriate.

- No

Will you process personal data? If so, briefly describe the kind of personal data you will use in the comment section. Please refer to specific datasets or data types when appropriate.

- Yes

KU Leuven: Data will be collected from farmers such as their name, email address, farm location and information on their farm (cultivation strategies, use of pesticides etc.) The participants will complete consent forms for the inclusion of their data and samples in the study. Data will not be published and will be stored on a secure (Sharepoint) server.

University of Antwerp: Data will be collected from farmers such as their name, email address, farm location and information on their farm (cultivation strategies, use of pesticides etc.) The participants will complete consent forms for the inclusion of their data and samples in the study. Data will not be published and will be stored on a secure (Sharepoint) server.

ILVO: Except for the internet research and literature study, all data generated by ILVO will be personal: Audio/video-recordings from interviews, focus groups and workshops will be generated. In addition, ILVO will analyse pseudonimised LMN-data managed by the Agency for Agriculture and Fisheries (see above). By use of a large-scale survey, emailaddresses will be collected only for sending a feedback-report to participants.

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

KU Leuven: Microorganisms isolated and identified from strawberry plants may show potential for use in commercial valorization. Isolated microorganisms may show potential as biocontrol agents which may be the subject of a patent application. Phages isolated against bacterial symbionts of pests or bacterial pathogens of strawberry may show potential for use in commercial valorization.

University of Antwerp: Microorganisms isolated and identified from strawberry plants may show potential for use in commercial valorization. Isolated microorganisms may show potential as biocontrol agents which may be the subject of a patent application.

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 in the comment section to what data they relate and what restrictions are in place.

- No

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 in the comment section to what data they relate and which restrictions will be asserted.

- No

2. 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).

KU Leuven: Protocols for laboratory procedures will be documented, digitized and stored on the SynBioS folder on the server (managed by KU Leuven) of the research group. Handwritten lab notebooks or digital lab books will be retained. readme.txt files will be used to guide interpretation and use of datasets in the future. A clear coding for all data files/folders related to the project will be used. These will have the form: WPX_TaskY_ddmmyyyy_researcherinitials. Once published, DNA/RNA sequences will be published on domain-specific repositories such as National Institute of Health (NIH) RefSeq or GenBank.

Physical data: Samples taken from the field or from experiments will be documented and stored in freezers for up to 5 years after the end of the project. Microbial strains will be preserved as freezer stocks, and a file with strain details (identification/source of origin/main characteristics/storage medium/revival guide/location in the freezer) will be maintained. Hard copy notebooks will be stored for at least 5 years after the end of the research.

University of Antwerp: Protocols for laboratory procedures will be documented, digitized and stored on the server of the research group which will help with data interpretation in the future. Handwritten lab notebooks will be retained and digitized as necessary. readme.txt files will be used to guide interpretation and use of datasets in the future. Once published, DNA sequences will be published on domain-specific repositories such as National Institute of Health (NIH) RefSeq or GenBank.

ILVO: By use of README.txt and METADATA.csv files, stored at the ILVO-server in the SynBioS folder, both during and after finishing the project, information on data collection and processing of focus groups, interviews, etc. will be documented. The files will contain the file_ID, description of file ID, dataset specific metadata, storage location, access rights, dataset classification (Privacy/Non-privacy sensitive data), Note (Recording data must be deleted on YYYYMMDD, Recording was removed on YYYYMMDD) etc. Also informed-consent templates will be stored to keep the information on what was agreed on with the participants of the stakeholder activities.

Will a metadata standard be used to make it easier to find and reuse the data? If so, please specify (where appropriate per dataset or data type) which metadata standard will be used. If not, please specify (where appropriate per dataset or data type) which metadata will be created to make the data easier to find and reuse.

- Yes

KU Leuven: Metadata with experimental procedures (including sampled species, sampling location, date and handling person, etc.), preparation information, storage, etc. will be created manually and saved to read and interpret the data for other users in the future. Persons that perform the experiments and generate the data will document this information (e.g. through readme.txt files).

University of Antwerp: Metadata will be stored on IRUA and with the domain-specific repository selected for data storage. Metadata will be stored according to IRUA and the specific repository.

ILVO: According to the meta data standards of the repository used, meta data will be stored. For data storage on the ILVO server, the following meta-data will be stored:

1) Project metadata: project name, project acronym, project number, project description, grant number, PID for related publications and outputs (eg doi)

2) Dataset general metadata: dataset name, dataset description, dataset embargo, dataset author(s), the author's organization name

3) Dataset specific metadata:

- For interviews: file-ID, doi if applicable, format (eg txt, mp3, mp4), interviewer, transcriptor if applicable, interviewee ID (a code assigned by the interviewer), location of the interview (country, digital, ..), date of the interview, sensitivity of the data (Privacy/Non-privacy sensitive data), processing (original file, pseudonimised, anonimsed), file-location, classification (privacy/non-privacy sensitive data), access rights, contact person
- For focusgroup/workshops: file-ID, doi if applicable, format (eg txt, mp3, mp4), moderator(s), transcriptor if applicable, number of participants, participants ID (a code assigned by the moderator), date of the focus group/workshop, location of the focus group/workshop (country, digital, ...), sensitivity of the data (Privacy/Non-privacy sensitive data), processing (original file, pseudonimised, anonimsed), file-location, classification (privacy/non-privacy sensitive data), access rights, contact person
- For dataset: file-ID, doi if applicable,format of dataset (eg .csv), data source (new data, ...), name data collector/processor, name organisation responsible for data collection, sensitivity of the data (Privacy/Non-privacy sensitive data), access rights, contact person
    - For surveys: number of respondents participating, number of respondents completing full survey, period of datacollection, average time to fill out, location (country, not city, digital)

3. Data storage & back-up during the research project

Where will the data be stored?

KU Leuven: The data will be stored on the university's central server with automatic daily back-up procedures. Experimental data will be recorded in lab notebooks and stored on .xlsx and .doc files on the server of the research group. Microbiome and other data will be stored, and protected on the server of the research group, which is only accessible by registered personnel. In case data is linked to publications, it will be also made available on public databases which have their own storage facilities (e.g. Sequence Read Archive, Genbank of NCBI). Biological data will be stored at 4°C fridges and -20°C and -80°C freezers with limited access. A copy of the bacterial, fungal and phage database will be kept at each consortium partner. Freezers with biological data are located in the labs which have restricted access for unauthorized personnel (e.g. by means of a badge-system).

University of Antwerp: The collected data will be stored on the password-protected server of the University of Antwerp managed by the university's ICT department with regular automatic back-ups. Experimental data will be recorded in lab notebooks and stored on .xlsx and .doc files on the server of the research group. Microbiome and other data will be stored, and protected on the server of the research group, which is only accessible by registered personnel.

ILVO: Electronic data will be stored in a dedicated SynBioS folder on a secured server on ILVO with limited physical and digital access for ILVO personnel involved in the SynBioS project. Access to data is only possible with the use of a personal login and password.

How will the data be backed up?

KU Leuven: KU Leuven server has a an automatic back-up procedure

University of Antwerp: The research group has a back-up server, where all data are automatically transferred to every week.

ILVO: To guarantee the continuity of the central systems, ILVO has an extensive backup system and hardware maintenance contract. Changes to the IT infrastructure are made in a controlled manner by IT-ILVO. Active Directory is reserved for ILVO computers. Software installations are done by IT staff only, network adjustments are only made by IT staff/ Installation and configuration of central applications / systems is only done by IT staff. External access to the internal network is only possible via a VPN connection.

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

Sufficient storage is available during the course of this project.

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

KU Leuven: Research group folders are only accessible by registered personnel (departmental security policy). Authentication takes place with a personal username and password. KU Leuven user accounts are created/managed by the IT department. Access rights to study data are provided upon decision by the head of the research group. Freezers with biological data are located in the labs which have restricted access for unauthorized personnel (e.g. by means of a badge-system).
Antwerp University: Research group servers are only accessible by registered personnel (departmental security policy). Authentication takes place with a personal username and password. University of Antwerp user accounts are created/managed by the IT department. Access rights to study data are provided upon decision by the head of the research group. Data in physical form (e.g. log books) are stored by the main responsible researcher at a protected location at the University of Antwerp.
ILVO: The secure ILVO-server has limited physical and digital access for ILVO personnel involved in the SynBioS project. Access to data is only possible with the use of a personal login and password. A password policy is enforced by an active directory policy (min. 8 characters, does not contain a user name or part of it, contains a mixture of letters, numbers and / or non-alphanumeric characters). To prevent unauthorized access to the data made available, the laptop must always be locked or turned off in case of absence. Access to data is limited to only those who need access to the data. Access to sensitive data is only obtained after signing a confidentiality agreement.
When exchanging personal electronic data, files are encrypted (eg 7-zip) with 256-bit encryption (eg AES-256). Passwords are never passed on via the same medium as the encrypted file.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

No costs expected during the research project.

4. 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...).

KU Leuven: All data will be retained for at least five years after the end of the project.
University of Antwerp: All data will be retained for at least five years after the end of the project.
ILVO: Audio/video recordings will be made to avoid losing information during the interviews/focus groups/workshops. Recordings will be anonymised or pseudonymised as soon as possible (within 3 months). Afterwards, recordings will be deleted in function of data minimalisation.
The personal data (except recordings) obtained in the course of the research will be retained for 5 years after the closing date of the research (or longer - until the statutory retention period has expired - if this is required by law and destroyed afterwards). If applicable, if we have an explicit consent or if granted permissions or protocols permit it, the personal data will be retained for any subsequent research.
Anonymised data will be retained for at least five years after the end of the project.

Where will these data be archived (stored and curated for the long-term)?

KU Leuven: Data will be archived on the server of the research group and on the domain-specific repository selected.
University of Antwerp: Data will be archived on the server of the research group and on the domain-specific repository selected.
ILVO: Anonymised ata will be archived at the ILVO-server.

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

No costs expected.

5. Data sharing and reuse

Will the data (or part of the data) be made available for reuse after/during the project? In the comment section please explain per dataset or data type which data will be made available.

- Yes, in an Open Access repository
- Yes, in a restricted access repository (after approval, institutional access only, …)
- No (closed access)

KU Leuven: After publication, the data will be made available through domain-specific open access repository. If microorganisms or phages show good biopesticide potential, a patent application will be filed. Therefore it will not always be possible to share these data immediately

Antwerp University: After publication, the data will be made available through repositories such as IRUA and a domain-specific open access repository.

ILVO: after publication, anonimised data will be made available in a repository, e.g. ZENODO.

If access is restricted, please specify who will be able to access the data and under what conditions.

KU Leuven: We do not anticipate access will be restricted after publishing. Before publication of research or before patent application, the data will be available to researchers in the SynBioS project.

Antwerp University: We do not anticipate access will be restricted after publishing. Before publication of research the data will be available to researchers in the research groups responsible for data collection and analysis.

ILVO: personal data will only be accessible to ILVO researchers with a relevant role in the project for whom access to the data is neccessary in order to perform SynBioS' research activities. Access to personal data is only obtained after signing a confidentiality agreement. Data will be pseudonomised as soon as possible. After publication, anonimised data will be made accessible.

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 in the comment section per dataset or data type where appropriate.

- No
- Yes, Privacy aspects

KU Leuven: Microbiome data, isolate information and other data collected will be made available after publication. Microorganisms and phages that show potential will not be shared because of patent application filing

Antwerp University: Personal data such as that collected from farmers will not be made publicly available in repositories. Relevant metadata collected from farmers such as cultivation types, soil types and other data will be processed and made available as part of the microbiome data which will be published. Microbiome data, isolate information and other data collected will be made available after publication.

ILVO: Due to privacy concerns: the personal data (except recordings) obtained in the course of the study through interview, focus group, workshop, survey will be kept for up to 5 years after the closing date of the study (or longer - until the legal retention period has expired - if required by law and then destroyed). If applicable, if we have explicit consent or if granted consents or protocols allow, personal data will be retained for possible follow-up research. In agreement with Agency for Agriculture and Fisheries, pseudonymised LMN data will not be shared. (For more information see: http://vtc.corve.be/docs/beraadslagingen/VTC_beraadslaging_2012_07.pdf).

Where will the data be made available? If already known, please provide a repository per dataset or data type.

Ku Leuven: Data can be made available in the general database ZENODO or DRYAD or more domain specific repositories.

Antwerp University: A domain-specific repository will be selected, this may include ENA, NIH or others. Additionally, publication of a data manuscript in a domain-specific data journal may be possible.

ILVO: Data can be made available in the general database ZENODO or more domain specific repositories.

When will the data be made available?

Antwerp University, KU Leuven, ILVO: Data will be made available following publication of research findings in a peer-reviewed journal.

Which data usage licenses are you going to provide? If none, please explain why.

Antwerp University, KU Leuven, ILVO: A general license such as CC BY may be selected.

Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, you have the option to provide it in the comment section.

- Yes

What are the expected costs for data sharing? How will these costs be covered?

No costs are expected.

6. Responsibilities

Who will manage data documentation and metadata during the research project?

KU Leuven: Liese Vlasselaer, Katto Macharis, Sara Van Hee, Pauline Verhage, Jeroen Wagemans; Antwerp University: PhD student Brianne Newman will manage data documentation and metadata documentation during the course of the project., ILVO: Kaat Peeters

Who will manage data storage and backup during the research project?

Antwerp Univerisity: Dr. Stijn Wittouck and Dr. Sarah Lebeer (PI) are responsible for data storage and server backup, ILVO: Kaat Peeters, ILVO ICT department, KU Leuven: Barbara De Coninck, Bart Lievens, Rob Lavigne and ICT department

Who will manage data preservation and sharing?

Antwerp University: Brianne Newman, Sarah Lebeer and Stijn Wittouck, ILVO: Kaat Peeters, KU Leuven: Barbara De Coninck, Bart Lievens, Rob Lavigne

Who will update and implement this DMP?

Antwerp University: Sarah Lebeer (PI) bears overall responsibility for the implementation and adjustments of this DMP, ILVO: Kaat Peeters, KU Leuven: Barbara De Coninck, Bart Lievens, Rob Lavigne

SynBioS: Synergistic biocontrol technologies for disease and pest management in strawberry
GDPR

GDPR

Have you registered personal data processing activities for this project?

- Yes

SynBioS: Synergistic biocontrol technologies for disease and pest management in strawberry
DPIA

DPIA

Have you performed a DPIA for the personal data processing activities for this project?

- Not applicable