



Memorandum of understanding

July 2020

Article 1 – Purpose and Objectives

PhenObs is an international network of botanical gardens. Our aim is to investigate the phenology of herbaceous species and how phenology is affected by global change. This knowledge will help us to improve our understanding of the implications of phenological shifts for biodiversity, ecosystem functions and services. We will achieve our aims through the collection of phenological and trait data across a global range of sites using standardised protocols. Specifically, our main research questions are:

- How does the phenology i.e. distinct phenological phases of herbaceous species vary at regional and global scale?
- What are the drivers of variation in plant phenology in herbaceous species across the growing season and in response to variation in climate?
- Can plant phenology be predicted from species' trait composition, provenance, position and extent of the distribution range and species' phylogeny (as proxy for their eco-physiological adaptation)?
- What are the implications of this variation with respect to species performances and assembly, biotic interactions as well as ecosystem processes and services under changing land-use and climate?

Here, we define the network structure and establish policies for communication, data use and publication.

Article 2 – The members

2.1 The PhenObs network consists of members who conduct phenological monitoring and take trait measurements on herbaceous species in Botanical Gardens following the PhenObs protocol using their own funds. In addition, the PhenObs network comprises the members of the first PhenObs Workshop that launched the global network at the German Research Centre for Integrative Biodiversity Research Halle-Jena-Leipzig (iDiv) in Leipzig in November 2018. PhenObs members strictly adhere to the PhenObs protocols for data collection and share data associated with the project in the common PhenObs repository. A list of members is available on the PhenObs website.

2.2 PhenObs aims to be inclusive and new contributing network partners may enter the network at any time, if the steering committee agrees.

2.3 Membership in the network can be ended by the member or by the steering committee if the member withdraws his/her data entirely. Membership can also be terminated by a two-thirds decision of the steering committee if a member has seriously failed to observe the policies outlined here, or if a member has been inactive for a longer period.

Article 3 – The steering committee and network coordination

3.1 The steering committee is responsible for establishing general guidelines for the network, and oversees the everyday business of PhenObs. The steering committee shall represent the network with regards to communication with the contributing gardens, decides upon the membership, co-ordinates compilation and management of the dataset and the handling of data requests. The steering

committee currently consists of the eight members: Christine Römermann (PI, Friedrich-Schiller University Jena & iDiv), Isabell Hensen (PI, Martin-Luther University Halle-Wittenberg & iDiv), the PhenObs coordinator and data manager (post-doc, Friedrich-Schiller University Jena & iDiv), Birgit Nordt and Albert-Dieter Stevens (both Botanical Garden & Botanical Museum Berlin, Freie University Berlin), Martin Freiberg (Leipzig University & iDiv), Solveig Franziska Bucher (Friedrich-Schiller University Jena) and Aletta Bonn (Friedrich-Schiller University Jena & iDiv & UFZ).

3.2 The network is coordinated by the PhenObs team based at the Department of Plant Biodiversity, Institute of Ecology and Evolution, Friedrich-Schiller University Jena, which includes the data manager and coordinator who will communicate with members for the duration of the network. The coordinating team is responsible for overseeing the everyday business of the PhenObs Network.

3.3 The steering committee will meet three to four times per year. All network members are welcome to join the meeting and to suggest agenda points.

Article – 4 Data collection and exchange

4.1 All data contributed to the common data set will remain intellectual property of the individual data contributors and may be withdrawn at any time.

4.2 Data will be collected and curated in a first step by each contributing network partner and will then be sent to the data manager. The data manager will collate, clean, and backup the common data set. On a regular basis and upon request, the data manager will provide copies of the common dataset to the members.

4.3 When collecting and contributing data, all participating gardens must follow the monitoring protocol defined by the steering committee and use the templates for data submission provided. These will be distributed via email and are also available on the PhenObs website.

4.4 PhenObs data may only be used by PhenObs members and for specific research projects.

4.5 Data received from the PhenObs network should not be circulated to other people who are not listed in paper proposals (see 5.2), or posted online to publicly accessible sites.

Article 5 – Paper proposals and paper writing

5.1 There will be two basic network publications coordinated by Jena addressing the PhenObs questions and using the common data set. The first publication introduces the project scope, protocol and preliminary results and will be co-authored by the partners of the pilot study 2017/2018. In this paper, a link to the webpage with the overall PhenObs consortium will be included. The second publication will show the first in-depth analyses including also trait-phenology relationships. All contributing partners e.g. those who contribute data to the common data set will be co-authoring these basic publications.

5.2 Additional paper proposals from members using the PhenObs data are welcomed by the steering committee. If you wish to write a paper using PhenObs network data, a proposal should be submitted to the steering committee including (i) the applicant's name and address, (ii) the names of all intended co-authors from inside (non-obligatory) and outside (obligatory) the network, (iii) the preliminary title,

(iv) an abstract, (v) the estimated time of manuscript submission, (vi) a specification of the data needed. The steering committee will decide on the proposals.

5.3 The PhenObs Steering Committee will send the approved paper proposal to all members and inform them which data from which contributors is proposed for inclusion in the respective analyses. The members can then declare their willingness to join the paper project as active co-authors during a period of one month (opt-in papers).

5.4 Lead authors should circulate the first paper draft upon completion to all co-authors and the final manuscript at least three weeks before submission and invite comments from co-authors at each of these stages. All co-authors should review and approve the final manuscript before submission.

5.5 Each garden is free to collect, analyse and publish more specific (facultative) data that complement the core data set. We ask the members, that these analyses do not compromise the questions being addressed by the network using the full PhenObs dataset (but see 5.2).

5.6 To avoid problems between PhenObs members during the publication processes and to prevent the blocking of research topics, if a manuscript is proposed and subsequently not worked upon for a reasonable time, other interested PhenObs members or the steering committee may discuss with the lead author taking over development of the manuscript.

5.7 In any publication, presentation or course making use of PhenObs Network data, the applicants are obliged to give appropriate credit to PhenObs, acknowledging that data were made available through the PhenObs Network. All bodies that financially supported the network must be acknowledged as specified on the PhenObs homepage.

5.8 Upon publication, members are invited to send the paper(s) using PhenObs data to the PhenObs data manager. Links to these papers will be added to the PhenObs website.

Article 6 – Authorship

6.1 All data owners who have contributed data at the time of paper preparation can become co-authors of any publication unless they do not wish to be listed as co-authors.

6.2 PhenObs adheres to established good practices on scientific publication. In case of uncertainty on the co-authorship arrangements, inclusive rather than exclusive principles should be applied.

Article 7 – Statement of Consent

If a data owner has officially submitted data for inclusion in the PhenObs dataset to the PhenObs Steering Committee, this is considered an implicit agreement with these policies and rules. Members also agree to having their names published on the PhenObs member list published on the PhenObs website.

By request, we can provide this memorandum of understanding as a bilateral document that is signed by a representative of the steering committee and the member.