User Guidelines (Nutzerordnung) of the

Phenospex PlantEye f600 Microscan

Device at the University of Cologne

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GENERAL INFORMATION

Company: Phenospex, Herleen, The Netherlands. www.phenospex.com

The Phenospex PlantEye f600 sensor (https://phenospex.com/products/plant-phenotyping/planteye-f600-multispectral-3d-scanner-for-plants/) is a multispectral 3D scanner that allows high throughput quantification of morphological and spectral parameters such as leaf area, digital biomass, plant height, light penetration depth and chlorophyll content (greenness). For explanations on all phenotypic parameters measured by the PlantEye F600, see https://phenospex.helpdocs.com/plant-parameters-phena-2-0. The PlantEye is a portable phenotyping platform for automated, non-invasive plant phenotyping. It automatically assigns images and their output measurements to the identity of the plant in the pot and hence to previous plant measurements, allowing to draw individual plant growth curves. The MicroScan is the portable phenotyping device implementing the PlantEye f600 sensor (https://phenospex.com/microscan-for-small-digital-phenotyping-tasks/).

The PlantEye measurements are visualized and analysed with HortControl, the central software developed by Phenospex (user friendly interface). HortControl is a web-based software which does not need to be installed on your computer. It will be accessible when your computer is connected to the Phenospex (see below).

The equipment in Cologne includes:
. The sensor PlantEye F600
. The Microscan frame and table
. The transport case (Pelicase)
. The connecting cables: network/communication cable between the frame and LAN port of the laptop, the trigger/power cable to connect between frame and PlantEye, the power supply
. The handheld scanner
. A rolling platform on which the Microscan is fixed, built by the UzK Biozentrum' workshop.
. The manuals (Microscan Quick Setup manual and HortControl User manual)

ACCESS

Location: Universität zu Köln, Biozentrum, Zülpicher Str. 47b, 50674 Cologne, Room 3.403 (AG de Meaux).

The Phenospex PlantEye f600 Microscan is a DFG-funded instrument, through the Collaborative Research Center TRR 341 "Plant Ecological Genetics". It is accessible to all research groups within the CRC TRR341 from the University of Cologne, the Heinrich Heine University Düsseldorf, the Ruhr University Bochum, the University of Potsdam, the Phillips University Marburg and the Max Planck Institute of Plant Breeding Research in Cologne. Access to the PlantEye Microscan is managed by Renan Granado. He will assist you with the set up and connexion and will provide the necessary training before its first use.

⚠️ An initial training is mandatory before first access to the phenotyping platform.

⚠️ An online booking calendar is used to create, modify and delete reservations of the PlantEye (see below).

Non-TRR341 projects and scientists who would be interested to use the PlantEye must contact one TRR341 member and Renan Granado to discuss access to the device. The booking will then be done only through TRR341 members (with the interested group named as collaborator). However, the TRR341 users have priority access.

GENERAL RULES, USAGE GUIDELINES AND USER RESPONSIBILITIES

After the initial training, a user can independently book, pick up and use the Phenospex PlantEye. At any time during usage, users are free to ask the coordinator/instructor for assistance.

The PlantEye f600 is a portable device than can be used in the lab, in the greenhouse as well as in the field by all participating institutions of the CRC TRR341.

Manuals for the PlantEye f600 Microscan and the software HortControl are available in room 3.403 with the device. The HortControl manual can also be found within the software (under the information bar) as well as in the Phenospex folder on Sciebo. It is advised to read through the HortControl User manual before using the phenotyping platform.

There is no computer/laptop affiliated to the PlantEye, users have to use their own laptop.

Connecting to HortControl: HortControl does not need to be installed on your computer. It is a web-based software, which is Google Chrome compatible (it is advised to update to the latest Chrome versions prior to use).

⚠️ Two ways of connecting with your laptop to the PlantEye through HortControl are possible.

1. Bringing your Laptop to the Phenospex PlantEye: The device is connected directly to the LAN port of the laptop through the LAN cable. The laptop receives an IP address (or one has to be set up manually). The user can then connect to HortControl by typing the IP address of Cologne's PlantEye http://192.168.177.250.

2. Working remotely with the Phenospex PlantEye, for groups located in the Biozentrum in Cologne only: The device must be previously connected to your group's subnetwork or your individual computer by the IT, be connected by the LAN cable to the network, switched on, and your computer must also have access to the group's subnetwork or the Phenospex directly. You can then access the Phenospex remotely with the following link http://phenospex.botanik.uni-koeln.de/home/

Login: When connecting to HortControl, a login prompt will appear and you will be asked for the credentials. Use the user credentials: **User = psx-usr, Pwd = psx-usr**.

Multiple experiments will be running on the phenotyping platform simultaneously (managed with the Experiment Board in HortControl).

Setting up a new experiment in HortControl involves

- reserving experimental block(s)
- after configurating your experiment blocks, create a name for your experiment

The PlantEye f600 has a 1,8TB storage space and only a limited number of experiments blocks available. Thus, it is not an infinite resource and old experiments will be deleted by the administrator when space is needed and blocks need to be set free, after contacting the owner of the experiments. It is therefore important to be able to trace back the person behind the experiments/reserved blocks. To this purpose, we ask for the following rules:

⚠️ Your name should be included (Familyname_firstname_xxx) to the name of your experiment

⚠️ A check-in sheet is attached to the PlantEye. Please fill in your name, AG (Arbeitsgruppe), TRR341 Project ID, the reserved block numbers, your experiment name, and the check-in and check-out times.

⚠️ Write down your reserved block(s) numbers and the name of your experiment for yourself, to be able to retrieve it later, especially for long-term experiments with several measurements in time.

Once your experiment is done (all your sets of measurements have been taken), we ask you to 'Stop' your experiment (Dashboard -> Experiment-> Stop Experiment), to free the blocks for other users. Your experiment will not be deleted when being stopped and you will still be able to download the data, but you will not be able to add any more data to it. Until it is stopped, your experiment stays 'Active', your blocks are still reserved for you, and you can keep adding later measurements.

Users are obliged to handle equipment with precaution and according to the instructions given during training. The Microscan table should be clean after use. The PI is responsible for the behaviour of the user. In case of incorrect behaviour, we reserve the right to restrict the access to the phenotyping platform.

RESOURCE BOOKING GUIDELINES AND PRIORITIES

The online booking system is available at https://booked.uni-koeln.de/trr341planteye

Users have to create a user account for the booking system (or after invitation). User data (name, email, institution, TRR341 project) are stored in the booking system and secured with a personal user login. The booking system is used to record booked time for the DFG.

While reserving the PlantEye in Booked, the Title and Description fields are only optional, they do not need to be filled.

Reservations in the booking calendar are mandatory prior to the usage of the Phenospex PlantEye (2 days before use). Short-term cancellations should remain an exception. Reservations must be first approved by the resource administrator (Dr. Charalampos Mantziaris, TRR341 scientific coordinator).

⚠ For TRR341 groups not within the University of Cologne, we ask you to plan the use of the Phenospex long enough in advance, as the platform will have to go to your institutions and it will most likely stay longer than one day there.

In case of technical issues, the resource (device) will be blocked as early as possible and users with conflicting reservations will be notified.

The TRR341 users have priority access. Otherwise, the reservation and access will be approved on a first-come first-serve basis

DATA HANDLING, SECURITY AND STORAGE GUIDELINES

During usage of the phenotyping platform, the data are stored in the device's computer storage (3D .ply files and tabular .csv files with processed plant data).

⚠ After data acquisition, it is recommended for users to download their data directly on their laptop for data security. A backup of the system will be done regularly and stored separately; however, it will not be done after each single use, and the 3D files are not included in the system backup. You will be shown how to download your data in the training session.