

## Purdue University

### College of Agricultural Research and Graduate Education (ARGE)

### Plant Sciences – Ag Alumni Seed Plant Phenotyping Facility (AAPF)

#### SOP for Conducting an Experiment

Effective starting April 1, 2023

- 1) Researchers are to schedule a time with the facility manager and/or Director of Digital Phenomics to discuss experimental needs **FOUR WEEKS** prior to the start of an experiment
- 2) Customer needs to submit preliminary experimental design to facility manager for review and edits at least **TWO WEEKS** prior to the start of an experiment. The facility manager will provide a design template with required information for importation into PPEW and ISAL.
- 3) Once the final design is agreed upon, the facility manager can help ensure randomization by assigning unique barcodes to each pot and loading them into the growth chamber in a random order and will import this information into PPEW and ISAL
  - a. Facility manager will print barcodes and metadata (e.g. experiment design, treatments etc.) labels for each experiment
- 4) Facility manager will create Metadata and Parameters file for each experiment to share with the customer and will also retain a copy in AAPF for record keeping
- 5) Facility manager will provide a safety training and overview prior to each lab using the facility
- 6) Facility manager will grant card swipe access to lab members involved with the experiment
- 7) Each lab growing plants in AAPF will need to mix their own potting media and fill all pots for the experiment **ONE WEEK** prior to entering the pots into the growth chamber
- 8) To accommodate the automated irrigation management, after filling up the pots, lab members will need to weigh each pot at fresh weight directly after filling and the weight after each pot is fully saturated
  - a. Each pot will need to be watered several times and well drained to ensure the potting media is at full saturation
  - b. In addition, it is important to measure both the fresh weight and fully saturated weight of each pot
- 9) Each lab conducting experiments in AAPF is responsible for labeling their own pots with barcodes provided by the facility managers, and is responsible for loading the pots into the growth chamber system
- 10) The facility manager will oversee the loading of pots into the growth chamber by assigning activities in ISAL and use of barcode scanner.
- 11) The facility manager is responsible for implementing agreed-upon treatments and will monitor the daily operations of all activities.
- 12) After an experiment is wrapped up, the Plant Science team will deliver to the PI the phenotypic spreadsheets which include genotype/hybrid, treatment, and phenotypic traits extracted during the experiment
  - a. The raw images collected during the experiment will stay in the SmartAg directory for twelve (12) months after an experiment is finished. After twelve months, all the raw images will be archived in FORTRESS. Upon the PI's request, another copy will be provided to the PI's storage space/storage device
- 13) Clients can request the following data analysis services based on their specific needs:
  - Exploratory data analysis (EDA) of phenotypic data
  - Identifying key phenotypic features related to ground truth data
  - Classification, regression, or clustering results
  - Assistance with data analysis script writing and creating scientific figures
- 14) Consulting Services

A dedicated data analyst from the Plant Science team can be assigned to your project. They can:

  - Choose the optimal programming language for data analysis based on their expertise.
  - provide relevant articles, papers, and links to support your independent exploration of the data processing pipeline and methods.

## 15) Client Responsibilities

To ensure a smooth collaboration, clients are expected to:

- Clearly communicate the goals of their experiment and desired data analysis.
- Provide detailed information on treatment and ground truth data, if needed.