UK Plant Phenomics Town Hall and Conference Report 2023

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1. Inaugural UK Plant Phenomics townhall and conference 2023 overview

Thank you to everyone who registered and attended the UK Plant Phenomics townhall and conference 2023. We had a total of 80 people register for the event and 64 people attended the event.

If you would like to provide some feedback so we can improve next years event, please go to the short feedback form on this link: https://forms.office.com/e/cMKgibRQ6a

We have already listened to the responses we have collected so far and have secured more accommodation on site for next year's conference which will be held at Warwick Conference Scarman centre on 4th – 5th September 2024. More details about the conference and abstract submission deadlines will be on our conference page, https://phenomuk.org/conference/

2. Strand 1: Access to Facilities

The facilities survey questionnaire – detail information and an exemplar shop window was presented at the conference. It highlighted the ways in which the Access trials would run – identifying and de-risking the challenges associated with a distributed network.

We had identified 3 major themes.

- transferable phenomics
- newcomers
- accessible 'custom'

The idea of comparing technologies also emerged (i.e., drone vs ground-based approaches).

Mentimeter showed that a major concern was data (although this is a strand 2 activity)

1. Harmonised data pipelines
2. Data linking
3. Support for data handling within infrastructures.

Although strand 1 doesn't deal with this directly, it's a strong guide from the audience that data is a major issue and obviously needs to link with the physical infrastructure in a seamless manner.

This also suggests that we are still mostly reaching the same audience – those already doing phenotyping. This emphasises the need to engage a wider community.

What's needed? Resilience

1. Replication of key infrastructure (for geographical reasons, throughput, shared expertise, avoid islands of activity)

2. People, skills, and training. The infrastructure is important but without skilled staff, equipment is useless.

3. Standardisation of sensors - but this is difficult in a fast-moving field.

4. New technologies – including above and below ground, facilities for veg not just wheat, also nutrients and controlled environments.

Suggestions for access trials – most of which would be accommodated under the themes above.

Most of the specific suggestions were as expected, but the need for small-scale field phenotyping (e.g., small test plots in quarantine fields), below-ground phenotyping, pests and diseases, seed germination (already exists in lab?) came up. Anatomy, robotics raised but could be tested in trials using existing facilities. An obvious emphasis on field by CE also mentioned multiple times.

3. Strand 2: Digital Infrastructure

Thank you to all the participants of the conference for dedicating their time to complete this Mentimeter questionnaire. We would like to now offer our reflection on the responses and feedback, and how we use these to inform our next steps.

We saw that the development of the DRI software focus equally in data sharing and curation and offer easy user interface and hassle-free data upload. Data access should be seamless through an appropriate API.

The DRI hardware approach shall offer a mix of compute and data provision to accommodate new ways of thinking about shared data, noting also that the community expects data needs to double every 5 years.

Of note was that the community expects to see experimental paradigms in the future that allow cross-dataset and cross-study meta-analysis. There was strong support that appropriate analysis methods that can be seamlessly integrated can help achieve this goal. This enforces our belief that AI can offer such potential.

There were questions from the audience surrounding how we validate what happens after the scoping exercise ends and in the importance of partnering with others. Indeed, our aim for the scoping exercise is to identify data exemplars that are small and specific, but at the same time illustrate the validity of the work and can help generate evidence for inclusion in the business case. Anything we deliver in terms of DRI will need to scale to meet the needs of the whole UK plant and crop communities. Therefore, we will clarify this aspect in the business plan and report solutions for future sustainability. For the scoping project, our aim is to find out what people in the community really need and how these needs match with the functionality/features of existing solutions infrastructures. Our first analysis shows that features are lacking to enable better solutions to data sharing and curation for this community. The answers provided in the Mentimeter will help us to prioritise what we can do now, given the time of the scoping exercise. We fully agree in the idea of partnering with others to help offer a solution. We do highlight that we want to change the ways of working in sharing and analysing data across sites and studies.

We conclude thanking the community for the feedback which will help shape what we do now as part of the scoping project and how we set the foundations for the business case to develop a national phenotyping infrastructure.

4. Strand 3: Networking & Engagement - Emphasis

The background to this series of questions was a presentation on the draft set of services currently being considered for provision by EMPHASIS. With access to phenotyping facilities already agreed and included in the activities of the EMPHASIS Directorate (or Statutory Seat) which will be based in Belgium, the remaining services are clustered into four Functional Units:

- Advancing Phenotyping Practices
- Data Management
- Education and Training
- Statistical Modelling

Note that the inclusion of Statistical Modelling is not yet agreed by the EMPHASIS, but only proposed for inclusion at the most recent EMPHASIS meeting.

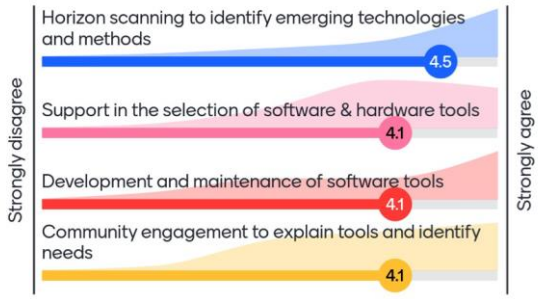
Following an overview of each Functional Unit's goals and services, delegates were asked to rate their agreement with each of two statements:

- This service would be valuable to the UK.
- I would be interested in delivering this service.

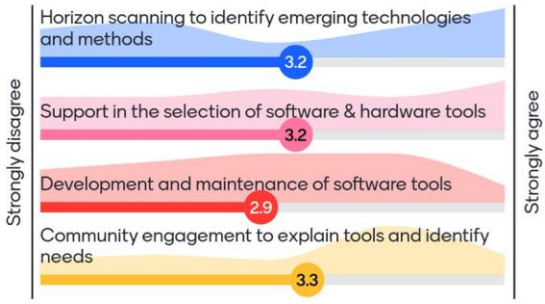
Note that while the services were presented in the context of EMPHASIS it is reasonable to assume responses would be similar if asked in the context of PhenomUK. Strong agreement that a service is useful should be taken as an indication it would be desirable for PhenomUK to provide it.

32 Participants responded to these questions. The results are summarised below.

Advancing Phenotyping Practices



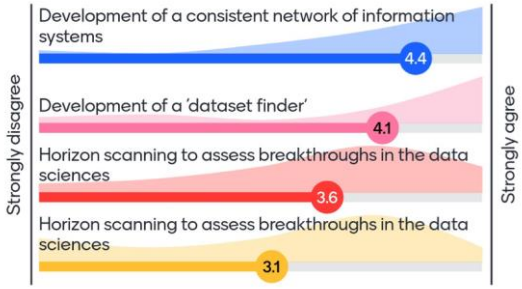
Useful to the UK

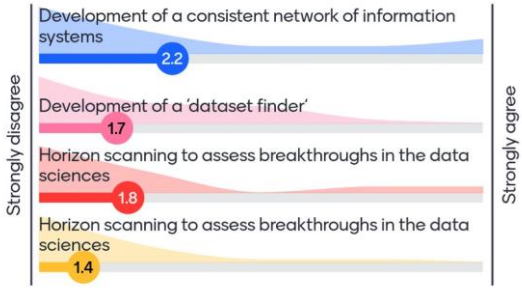


Interested in delivering.

Notes: The community wants these services. We had a very mixed audience, but the distributions are all tending quite heavily towards the strongly agree. There is less willingness to supply them but that's to be expected given the audience. The distribution on interest in delivering horizon scanning shows the split in the delegates' backgrounds.

Data Management

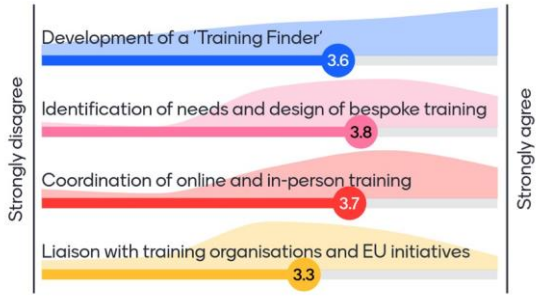




Useful to the UK Interested in delivering.

Notes: very strong response in favour of having a data management system, equally strong negative response to the idea of building it. This probably reflects the skills of those present. I actually feel much the same when it comes to us providing leadership on the EMPHASIS Functional Unit, it's a huge task and politically fraught. My reading of this, though, is that PhenomUK really should provide a UK solution.

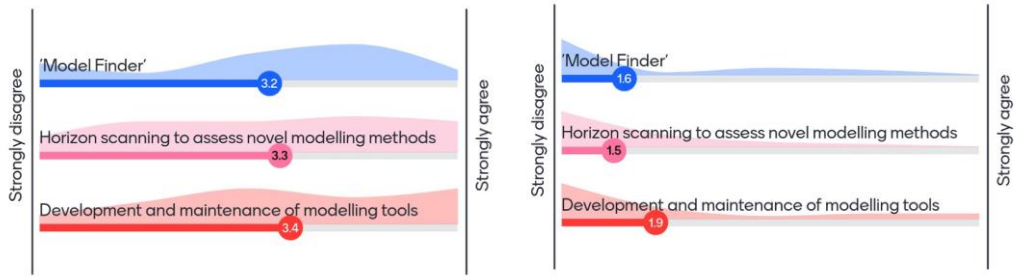
Education and Training



Useful to the UK Interested in delivering.

Notes: The peaks are further to the left than for the first two, but there's good support for having this service, and reasonable willingness to contribute. Thinking back to the discussion I think it depends what people are asked to do. Nobody wants to do the training finder, but the biologists don't have the skills and it's not massively interesting for the computer scientists so that makes sense. Perhaps something that is done via EMPHASIS rather than specifically by PhenomUK.

Statistical Modelling



Useful to the UK Interested in delivering.

Notes: Lukewarm response to the idea and no inclination to deliver it. I really think this is outside EMPHASIS' scope and it should be taken behind the shed and shot. From a PhenomUK point of view, we haven't included modelling, and this tells me we were right not to.