

ICAR 2013 Workshop

The International Arabidopsis Informatics Consortium (IAIC):

The Transition from TAIR to the Arabidopsis Information Portal (AIP)



Organized by: Blake C. Meyers, IAIC Interim Director

June 26, 2013

12:50 – 2:20 pm

We're on the web at:

www.arabidopsisinformatics.org

The agenda for today



Part I: IAIC introduction and progress towards the AIP

12:50- Blake Meyers, University of Delaware, USA, IAIC Interim Director

The IAIC: How we got here and what's next for Arabidopsis Informatics

1:00- Sean May, University of Nottingham, UK

Part II: Examples of community-contributed modules for the AIP

1:15 pm- Brian Gregory, University of Pennsylvania, USA

1:23 pm- Tetsuro Toyoda, RIKEN Institute, Japan

1:38 pm- Connie Hooper, The University of Western Australia

1:53pm- Josh Heazlewood, Joint BioEnergy Institute, Lawrence Berkeley National Laboratory, USA

2:08 pm- *Discussion/Feedback (see you next July in Vancouver!)*

- Arabidopsis informatics needs are growing quickly, with new data types and a rapidly increasing rate of data generation.
How to consolidate and integrate these data?
- Individual investigators are devising new data handling and visualization tools that have broad utility.
How to make these widely available?
- The Arabidopsis community is global, yet most of the current informatics support is funded on a national level.
How to leverage funding across borders?
- To summarize: what is the best way to internationalize Arabidopsis informatics efforts, to integrate new tools, to maintain long-term stability, and to address the needs of the users?

...and do this in a way that enhances the position of Arabidopsis in the top tier of model organisms.

2009: Discussion initiated: Arabidopsis meeting, Scotland

2010: Two workshops launched the IAIC and coordinate efforts

- The Multinational Arabidopsis Steering Committee: UK, April
- The North American Arabidopsis Steering Committee: US, May
- *1st collaborative publication*

2011: RCN: An International Arabidopsis Informatics Consortium

- Funded in June, 2011 for \$500K over five years.

“Design Workshop” to brainstorm for the AIP

- Atlanta, in December, 2011.
- *2nd collaborative publication*



Continuing Community discussions like this one

- 2009/10/11/12/13 “ICAR” (Arabidopsis) conferences.
- 2011/12/13 Plant & Animal Genome conferences.

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COMMENTARY

An International Bioinformatics Infrastructure to Underpin the *Arabidopsis* Community

International Arabidopsis Informatics Consortium^{1,2}

The future bioinformatics needs of the *Arabidopsis* community as well as those of other scientific communities that depend on *Arabidopsis* resources were discussed at a pair of recent meetings held by the Multinational Arabidopsis Steering Committee and the North American Arabidopsis Steering Committee. There are extensive tools and resources for information storage, curation, and retrieval of *Arabidopsis* data that have been developed over recent years primarily through the activities of The Arabidopsis Information Resource, the Nottingham Arabidopsis Stock Centre, and the Arabidopsis Biological Resource Center, among others. However, the rapid expansion in many data types, the international basis of the *Arabidopsis* community, and changing priorities of the funding agencies all suggest the need for changes in the way informatics infrastructure is developed and maintained. We propose that there is a need for a single core resource that is integrated into a larger international consortium of investigators. We envision this to consist of a distributed system of data, tools, and resources, accessed via a single information portal and funded by a variety of sources, under shared international management of an International Arabidopsis Informatics Consortium (IAIC). This article outlines the proposal for the development, management, operations, and continued funding for the IAIC.

The Multinational Arabidopsis Steering Committee (MASC) and the North American Arabidopsis Steering Committee (NAASC) hosted workshops in Nottingham, UK (April 15 to 16, 2010) and Washington DC (May 10 to 11, 2010) to consider the future bioinformatics needs of the *Arabidopsis* community as well as other science

recent years primarily through the activities of The Arabidopsis Information Resource (TAIR), the Nottingham Arabidopsis Stock Centre (NASC), and the Arabidopsis Biological Resource Center, among others. However, the *Arabidopsis* community and funding agencies recognize the need for a single data management infrastructure.

level modeling of plant processes and ultimately to translate these findings to crop plants. To achieve these goals, we must develop novel approaches to data management, integration, and access.

The UK workshop addressed three principal issues: the types of data generated by the *Arabidopsis* community, the types of

- **Goal:** *What should the AIP be, and how to achieve it?*
- **Workshops Outcomes**

Brainstorming transformative aspects of the AIP

Examples:

- **Modular design:** integrate global resources
- **Individualized user space:** ‘Dashboard’
- **Full integration of social media tools:** App store
- **Allow direct access to databases, data stores, and other low level assets:** “power users” can develop new methods and applications

Identifying challenges for the AIP

Examples:

- **Achieving community buy-in**
- **Community agreement on data standards and their adoption**
- **Redirection to community development of apps**
- **Discrete fundable projects**
- **Leveraging existing cyberinfrastructure**

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COMMENTARY

Taking the Next Step: Building an Arabidopsis Information Portal ^{OA}

The International Arabidopsis Informatics Consortium^{1,2}

The Arabidopsis Information Portal (AIP), a resource expected to provide access to all community data and combine outputs into a single user-friendly interface, has emerged from community discussions over the last 23 months. These discussions began during two closely linked workshops in early 2010 that established the International Arabidopsis Informatics Consortium (IAIC). The design of the AIP will provide core functionality while remaining flexible to encourage multiple contributors and constant innovation. An IAIC-hosted Design Workshop in December 2011 proposed a structure for the AIP to provide a framework for the minimal components of a functional community portal while retaining flexibility to rapidly extend the resource to other species. We now invite broader participation in the AIP development process so that the resource can be implemented in a timely manner.

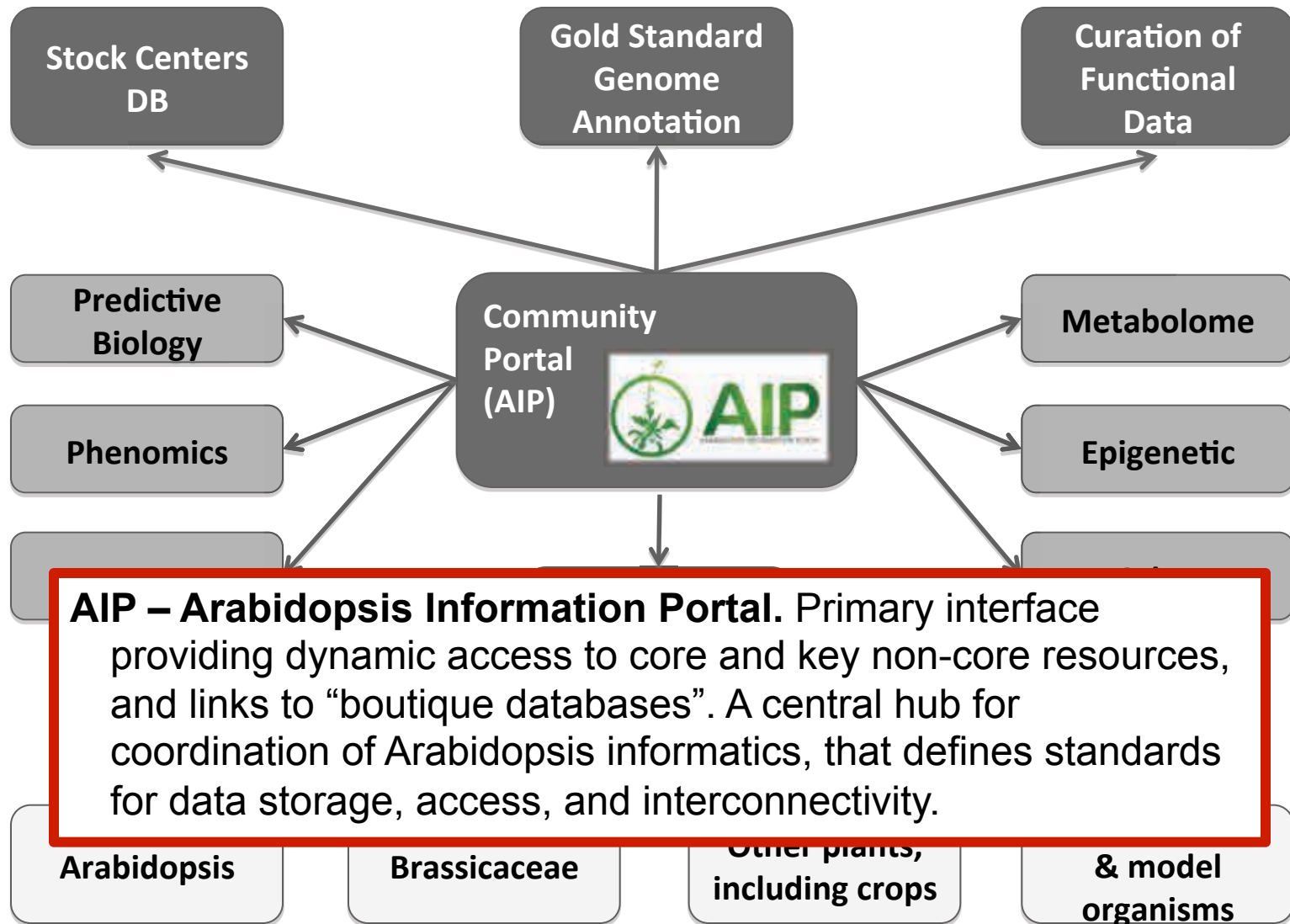
INTRODUCTION

Increasing global demands for improved agricultural products including fiber, food, and fuel intensifies the need for a thorough understanding of the basic biology and ecology of plants. The growing challenges of climate instability, competition for arable land, and the need to transition to renewable and carbon-neutral energy sources will only

cross and other economically and agronomically important species. As in nearly all major scientific endeavors, the *Arabidopsis* community is global. However, in recent years, most of the financial support for the primary community informatics resource has been provided on a national level, specifically, the funding of The Arabidopsis

storage, access, and interconnectivity. It is worthwhile emphasizing that the *Arabidopsis* community in particular, and the plant community as a whole, needs the services currently provided by TAIR, and in the near future to be provide by the AIP, because innumerable non-*Arabidopsis* publications reference *Arabidopsis* genes. In the ab-

Design Workshop: A proposed structure of the AIP



Scientific Advisory Board (SAB) to provide key AIP oversight and:

- Guide and shape future activities
- Help to encourage compliance with standards set by the AIP
- Point of contact with the community/contributors

Members elected February 2012

1. **Mark Estelle**, University of California, San Diego, USA (**chair**)
2. **Gloria Coruzzi**, New York University, USA
3. **Kazuki Saito**, RIKEN PSC, Chiba University, Japan
4. **Magnus Nordborg**, GMI, Austria
5. **Mark Forster**, Syngenta, UK
6. **Paul Kersey**, European Bioinformatics Institute (EBI), UK
7. **Xuemei Chen**, University of California, Riverside, USA

Current Status of Portal Development

- 1. September 2012:** AIP proposal submitted to NSF by Chris Town *et al.*
- 2. Early 2013:** The proposal team was asked by NSF to develop a detailed "Project Execution Plan (PEP)".
- 3. Late April 2013:** Team visits NSF for a reverse site visit.
- 4. June 2013:** PIs continue to refine the PEP in response to the site visit team's concerns and NSF's desire for a fully detailed PEP.
 - *It is hoped that a final PEP will be achieved in the next 1-2 months.*

Updates on the TAIR to AIP Transition

- 1. March 2013:** most TAIR software has been migrated to run on iPlant Collaborative (iPC) hardware.
 - The TAIR interface will continue to be available at the same URL (<http://arabidopsis.org>) after the migration is complete.
 - The URL will direct traffic to the TAIR software running on iPC servers.

Module integration and development

After AIP funding is secured top IAIC priorities will be:

- to facilitate integration of existing community modules into the AIP
- to identify community members that are interested in developing modules for integration into the AIP

Outreach to other plant communities

- Begin engaging more fully in outreach and integration with other plant communities including crop researchers.
- Plans for international efforts will be augmented by interactions with the Multinational Arabidopsis Steering Committee (MASC) and other plant networks.

- Participate in the IAIC and in oversight of the AIP via the Scientific Advisory Board (SAB)
- Continue to develop open standards, to push for open data, good metadata, & open source requirements, w/ enforcement led by IAIC
- **Develop proposals for grants in home countries that are coordinated internationally to develop a “federation” of closely knit components to the AIP**
- **Continue to remain engaged in the community-led process to ensure that the AIP meets current and future needs** (e.g. via conferences such as PAG and ICAR, and the Multinational Arabidopsis and North American Arabidopsis Steering Committees)

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