Australian
Plant Phenomics Facility

Report on the 1st International Plant Phenomics Symposium

Canberra 22-24 April 2009

The First International Plant Phenomics Symposium was a timely meeting of plant biologists focussed on using plant phenomcis and functional genomics to address crop productivity. This conference was a particularly significant occasion for a number of reasons:

- It was the first International Symposium of its type – and the first time a group with diverse interests in plant structure and function have come together under a phenomics banner. The meeting was planned to help promote phenomics approaches and encourage development and spread of new techniques. The proceedings will be published in a special issue of the journal *Functional Plant Biology* and we expect it to have significant impact;
- It was the first major scientific event of the High Resolution Plant Phenomics Centre, the Canberra node of the Australian Plant Phenomics Facility. The Facility represents a significant investment by the Australian government and partners in scientific infrastructure; and
- It launched a collaborative approach to international plant phenomics.

The Symposium was attended by 128 registrants – 46 were international, 47 interstate and 35 from within Canberra. Registrants came from all the major phenomics centres, included the Director of the Scottish Crops Research Institute, the Director of Phytosphere and the Deputy Head of the Forschungszentrum Julich, Germany, researchers from the University of Sheffield, New York University, University of Dundee, Washington State University and Stanford University. There were also presentations and representation by commercial groups, including Monsanto, Bayer Crop Science and BASF / Crop Design.

This geographic spread of plant scientists, from Australian and international groups, underscored the level of global interest in plant phenomics as a source of techniques for better understanding of plant growth, performance and yield at the crop and population level. It was evident from presentations by extant and prospective plant phenomics centres in the UK, Europe and America that the levels of investment taking place are very high. Nonetheless, the Australian Plant Phenomics Facility is acknowledged to be at the cutting-edge in technology and to be taking a leadership role in encouraging collaboration (more on other phenomics centres below).

The Symposium was structured to reflect scientific questions the technology addresses, with sessions on biotic stress (including fungal pathogens), abiotic stress (including screening for drought tolerance), growth and yield and ecosystem dynamics and climate change. Papers covered the range of techniques used in phenotyping – including visible and hyperspectral imaging for growth and disease analysis, Chlorophyll fluorescence imaging, Infra-red thermography screening, use of radar reflectance to study soil and roots and others.

The Symposium also saw 30 posters displayed and a number of short research talks presented.

Papers canvassed not only technological advances but also the application of new phenotyping approaches to understanding plant performance and selection for breeding. This was seen as particularly important in the light of escalating demands on agriculture, globally. The need for a transformational advance in cereal yields, over and above the incremental annual increases afforded by current plant breeding technologies, was recognised as a driver for new technologies, as were the challenges of drought and salt stress.

Despite the novelty of many of the methods described at the Symposium, presentations were made showing the effectiveness of imaging techniques for screening large populations to identify salt tolerant cereals in controlled environments and heat and drought tolerant crop lines in the field. Looking to the future, it was agreed at the Symposium that a stronger vehicle for international collaboration should be established – and the International Plant Phenomics Initiative was launched. The Initiative will, over the coming months, develop an agenda and confirm priorities and actions at a meeting later in 2009. The agenda will likely include exchanging protocols, validating systems, exchanging staff for technical education and developing collaborative funding bids. The Initiative is being led by Forschungszentrum Julich and the Australian Plant Phenomics Facility.

There was significant industry and commercial support and sponsorship. Official proceedings were launched by David Papps, Chief Executive of the ACT's Department of Environment, Climate Change, Energy and Water, on behalf of the ACT government - which is a major supporter of the APPF and the Symposium.

The Symposium also attracted significant media attention; articles appeared in local and state newspapers and in specialist biological and technology e-newsletters/updates. A number of radio interviews were given by Bob Furbank.

Group photo of attendees