XVIII international botanical congress
IBC2011
CONGRESSNEWS
XVIII INTERNATIONAL BOTANICAL CONGRESS | 23-30 JULY 2011 | MELBOURNE AUSTRALIA **TUESDAY 26 JULY 2011**

The *Acacia* debate

A plant name dispute that has bubbled away for a decade has finally been resolved at the XVIII International Botanical Congress in Melbourne.

The species concerned are the acacias, which until now has included the Australian wattles and the thorn trees of the Serengeti—both highly recognisable and iconic groups of plants.

An important and controversial issue decided by the Nomenclature Section to put to the XVIII International Botanical Congress centred around the scientific use of the name *Acacia*.

Acacia taxonomy has generated much controversy in the scientific and wider community over the past decade. Careful research has shown that *Acacia* should be split into several genera, and a difficult decision was required as to whether the name *Acacia* should be used either for a very large group of species found mainly in Australia or for a smaller group found mainly in Africa and Central and South America.

Under the internationally accepted rules governing the correct naming of plants, the International Code of Botanical Nomenclature, the name would normally have remained with the African-American group, as this includes the species *Acacia nilotica*, which is the nomenclatural type species, the species which fixes the application of the genus name. However, a special provision of the Code allows for the name of the type species of a genus to be changed in cases like this, where strict application of the rules would require a large number of species to be renamed, and would cause confusion or significant difficulties for taxonomists or the wider community.

An application under this provision was made in 2003 by two Australian botanists who sought to make an Australian species the type species for *Acacia*. This was considered by the relevant botanical committees, who decided in its favour. The International Botanical Congress at Vienna in 2005 ratified this decision.

The proposal was highly controversial, however. *Acacia* is an important genus in both Africa and Australia: in Africa it includes iconic and characteristic savannah species such as many flat-topped thorn trees, while in Australia it is the dominant genus over much of the continent and includes the Australian floral emblem (the Golden Wattle, *Acacia pycnantha*). The Vienna decision was contested by a group of botanists involved with African and American acacias.

In essence, the controversy in recent years focused on the procedure used in Vienna to vote on the Australian proposal. Those opposed to the decision argued that the Vienna meeting used a flawed process, while those in favour of it argued that the process was valid and correct.

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Dynamic launch to scientific program


Richard Richards


Ken Cassman


Daniel Oritz-Barrientos


Else Friis


David Fischhoff


Jeff Amthor


Leonie C. Moyle

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The Melbourne Congress, in two important votes on the first day of the Nomenclature Section, supported the procedure used in Vienna by a large majority. Support for this decision was widespread and not confined to Australian delegates. This vote effectively confirmed that the type species of *Acacia* is now an Australian species.

Later in the Nomenclature Section meeting, proposals were considered to amend the rules under which plants are named, to allow a "compromise solution" to the *Acacia* problem. One proposal would have allowed botanists to continue to use the name Acacia for all the segregate genera; a second proposal would have created new names – *Austroacacia* and *Protoacacia* – for the Australian and African-American groups respectively.

Delegates at the Section voted, again by large majorities, to reject these compromise proposals. While many expressed an understanding of the difficulties caused by the renaming of the African-American acacias, many argued that the compromise proposals unacceptably compromised the rules of nomenclature and created a dangerous precedent.

In summary, the decisions taken in Melbourne confirm that the Australian acacias retain the name, while a new name is needed for the African and American species. Several options for achieving a good result in Africa and the Americas are available, and will be discussed and considered in the months ahead.

Key decisions of the Nomenclature Section of the XVIII IBC

The Nomenclature Section met for five days, 18–22 July 2011, to discuss proposals to amend the *International Code of Botanical Nomenclature*. The more significant changes to the *Code* are outlined below and will be put to Congress for ratification on Saturday.

Electronic publication of new names from 1 January 2012

The Nomenclature Section strongly supported a series of proposals prepared by the Special Committee on Electronic Publication set up by the Vienna Congress in 2005. This means that it is no longer required for new names of plants, fungi and algae (and type designations) to be issued in printed matter in order to be *effectively published* – effective publication being a fundamental requirement of the *Code*. As an alternative, publication online in Portable Document Format (PDF) in a publication with an International Standard Serial Number (ISSN) or International Standard Book Number (ISBN) is permitted. These new rules come into effect on 1 January 2012.

Rules were also approved to prevent changes to a particular electronic publication once it is issued, to prevent preliminary versions being effectively published, and to make clear the date of publication. Also approved was a series of recommendations on best practice, particularly with regard to long-term archiving.

Latin descriptions no longer required

Since 1935 it has been required for names of new plants and algae to be published with a Latin description or diagnosis. For names of fungi, the same rule has applied since 1958, whereas names of fossils can have either a Latin or an English description or diagnosis since 1996. These rules have now been changed so that all names governed by the *Code* require either a Latin or an English description or diagnosis on or after 1 January 2012.

One fungus, one name

For over 30 years, the *Code* has permitted separate names for the asexual and sexual forms (*morphs*) of certain fungi. This was an exception to one of the basic principles of the *Code*, whereby one taxon defined in a particular way can have only one correct name. This anomalous rule (Article 59) has now been deleted from the Code, so that different names applying to asexual and sexual morphs of the same fungus compete for priority in the same manner as other names (i.e. based on date of publication). An additional new set of rules will allow lists of widely used names to be protected en masse, so as to minimize disruption by applying the rule of priority strictly.

One fossil, one name

The *Code* also had special rules for names of fossils, whereby separate names could be applied to *morphotaxa*, each of which represents a particular part, life-history stage, or preservational state, even if those separate names could be demonstrated to belong to the same organism. The Nomenclature Section decided to abandon the whole concept of morphotaxa, so that when two or more morphotaxa can be shown to belong to the same organism, their names compete for priority in the usual way.

Registration of fungal names via MycoBank now required

Over the past several years, the online database MycoBank (www.mycobank.org) has become increasingly used by mycologists to register new fungal names and associated data, such as descriptions and illustrations. Upon registration, Mycobank issues a unique number which can be cited in the publication where the name appears. This number is also used by the nomenclatural database *Index Fungorum* and serves as a Life Science Identifier (LSID). The Melbourne Nomenclature Section approved a new rule in the *Code* whereby the publication of a new fungal name must include a citation of "an identifier issued by a recognized repository", at present the MycoBank number, in order to be *validly published* – valid publication being necessary for a name to have any status under the *Code*. This rule applies only to names of fungi.

The name *Acacia*

See the separate article about the Acacia code changes (front page).

New title for the *Code*

Finally, the *Code* is no longer the *International Code of Botanical Nomenclature*. The Nomenclature Section recognized the need to reflect better the groups of organisms covered by the *Code*, i.e., that algae and particularly fungi are nowadays separated from plants, and approved a new title: *the International Code of Nomenclature for algae, fungi, and plants.*

Good news! We can skip the Latin nomenclature

IBC 2011 Poster Books

Full delegates only. Please collect your Poster Book from the Registration Desk today

Plenary Speakers

Tuesday 26 July 2011

Dr Gerard Oostermeijer

0830 - 0915 Plenary Lecture

Plenary Hall 2

Integrating genetic and ecological data in plant conservation

Gerard Oostermeijer did his PhD in plant population biology at the University of Amsterdam, The Netherlands. His main research focus is on demographic, genetic and reproductive aspects of population viability of threatened plants and on implementing science into practical conservation and restoration management.

Professor Przemyslaw Prusinkiewicz

0915 - 1000 Plenary Lecture

Plenary Hall 2

Plant modelling

Przemyslaw Prusinkiewicz is a Professor of Computer Science at the University of Calgary, Canada. He is a pioneer of computational modeling and the visualisation of plant development, and co-author of the book, The Algorithmic Beauty of Plants, that opened this area to a wide audience. His current research is focused on computational models of development that link molecular-level processes to the macroscopic form of plants. For further information see http://algorithmicbotany.org

Wednesday 27 July 2011

Professor Tetsuya Higashiyama

0830 - 0915 Plenary Lecture

Plenary Hall 2

Live cell analysis of plant fertilisation

1999 Doctor of Science, University of Tokyo/ 1999~2006 Research Associate, University of Tokyo/ 2007~ Professor, Nagoya University; vice president of International Association of Sexual Plant Reproduction Research. ERATO Higashiyama Live-Holonics Project launched as a major Japanese government scientific research initiative for the next five years.

Professor Alexander (Zander) Myburg

0915 - 1000 Plenary Lecture

Plenary Hall 2

The *Eucalyptus grandis* genome sequence

Zander Myburg is an Associate Professor in the Department of Genetics at the University of Pretoria. His research program in the Forestry and Agricultural Biotechnology Institute (FABI) focuses on the genomics and molecular genetics of wood formation in Eucalyptus trees. In particular, his research has focused on the transcriptional regulation of cellulose biosynthesis in eucalypts. He is the coordinator of the international Eucalyptus Genome Network (EUCAGEN) and the lead investigator of the US Department of Energy (DOE) Joint Genome Institute (JGI) project to sequence the genome of the plantation species, Eucalyptus grandis.

Botanists in profile

Food security: how can we feed a growing world population, protect the environment and cope with a changing climate?

Chris Somerville, Philomathia Professor of Alternative Energy and Director of the Energy Biosciences Institute, UC Berkeley, USA, will speak on renewable energy and his studies of cellulose—the major structural element of plant walls and the most abundant component of terrestrial biomass. Cellulose is major component of many commodities, such as timber, paper, textiles and animal fodder, and research into cellulose synthesis will contribute to the future of biofuels as a source of renewable energy. The Energy Biosciences Institute is beginning a collaboration with the ARC Centre of Excellence in Plant Cell Walls, based in Adelaide and Melbourne, which researches plant cell walls as a renewable source of fuel, to improve human health and as superior raw materials for industry.

Australia and South Africa battle for Acacia

Sandra Knapp, The Natural History Museum, London, will talk about the hot debate on the future of the wattle as the genus Acacia may be split into a number of separate genera. Australia is claiming the name Acacia for our 1000 or so species of wattles, even though the 160 or so species in a separate subgroup have scientific priority— a South African species was described as the 'type specimen', which defines the genus. Can Australia hang on to the name through sheer weight of numbers or will South Africa regain Acacia and their national pride?

Biodiversity: describing and conserving plant life

W. John Kress will talk on DNA barcoding in plants—a new way of rapidly assessing genetic similarities and differences between specimens. This will help identify new species and study biodiversity in ecological systems. John can also talk about the new iPhone app, 'Leafsnap' which can identify trees from a photograph of a leaf. Leafsnap has been developed by researchers from Columbia University, the University of Maryland, and the Smithsonian Institution, and currently covers tree species in north east USA. W. John Kress is Director, Consortium for Understanding and Sustaining a Biodiverse Planet and Research Scientist and Curator of Botany, National Museum of Natural History, Smithsonian Institution Washington, DC.

Hugh Possingham, Director of the ARC Centre of Excellence for Environmental Decisions, University of Queensland, will talk about strategies to reduce species loss resulting from climate change or other human threats. In some cases we may choose to relocate a species to a location outside its current range in order to conserve the species. Hugh will discuss how to weigh up the benefits and risks of such a management strategy and how to prioritise such moves.

Stephen Hopper, the first Australian to head up the Royal Botanic Gardens, Kew in London, will talk about the plant conservation efforts of Kew Gardens, including their forward-looking Breathing Planet Programme—a 10-year action plan to rescue, revive and restore the plants and fungi that directly or indirectly sustain us all. At the conference Stephen will talk about the Plant List— a new global botanical database of plant species produced by Kew Gardens and Missouri Botanical Garden, St Louis. Food security, deforestation, overpopulation and climate change—plants are a key to solving all these problems.

Australian species

David Watson, Charles Sturt Uni, has this year published the first book on Australian mistletoes: Mistletoes of Southern Australia (CSIRO Publishing). He will talk on mistletoes, parasitic plants that obtain their water and nutrients from their host, and the birds that help to disperse them by eating the mistletoe fruit and releasing the seeds in their droppings. He's found that mistletoe fruit-eating specialists, who have co-evolved with the mistletoe species, tend to travel among trees that already have mistletoes in them, and that other, generalist species are more important in dispersing mistletoe to new sites.

Community involvement in conservation

Jill Sutcliffe, Manhood Wildlife and Heritage Group, West Sussex, UK, will talk about local community involvement in environmental protection, which is an aspiration of the 1992 Convention on Biological Diversity. The community group, through which some 200 volunteers have contributed over 11,000 hours to conservation, was recently awarded the Queen's Commendation for Voluntary work.

Join the Congress conversation online

There's already a lively conversation on twitter about the Congress and the nomenclature discussions.

You can join the conversation online by following @IBC11, @IBC11media. When you tweet please include the hash tag #ibc18 in your tweet.

If you're not a tweeter, you can still follow the twitter conversation at www.twitter.com by searching for #ibc18

Healthy crop of *Themes* at IBC 2011

Ecology, Environmental Change & Conservation

From competitors to pests to pathogens, plants have never had it easy. And as rising carbon dioxide levels and changing climate begin to bite, for many species life will only get tougher. Understanding the growing range of threats that plants face, and the species most likely to adapt to them, are some of the key components of theme 1 of IBC2011.

Climate change aside, people continue to harm plant biodiversity directly, from conversion of natural habitats to the unsustainable exploitation of natural resources. Next year marks a decade since Global Strategy for Plant Conservation (GSPC) was adopted at the 2002 Convention on Biological Diversity in a bid to halt biodiversity decline. Good progress continues to be made in implementing the strategy, yet the work required to safeguard the world's plant diversity has barely begun, and the coming decade will be crucial.

As a last resort, threatened species reintroduction has been used as an extinction prevention strategy for plant species for at least 100 years. However, most reintroduction attempts still fail. Data from reintroduction experiments can offer case studies to update standards and methodologies to improve the success rate.

Economic Botany, including Biotechnology, Agriculture & Plant Breeding

Nature has done it numerous times, so how hard can it be? One of the grand challenges identified within plant biology is to boost agricultural output by engineering C4 photosynthesis into crop plants. By concentrating CO2 in their leaves, C4 plants can photosynthesise more efficiently, and it's a trick now known to have evolved on over 50 separate occasions in wild plants – suggesting that the grand challenge is an achievable one. The International Rice Research Institute (IRRI) has spearheaded an international effort to engineer C4 photosynthesis into rice, and their results to date will be highlighted under IBC2011 Theme 2.

C4 photosynthesis is just one of the ways in which crop plants are being engineered for the future. Global population growth of 100 million people per year will mean that, by 2050, the productivity of the world's arable land will have to double to feed them all. This target cannot be achieved by conventional breeding methods alone. Recent advances on designing crop plants to meet the future challenges will be discussed, alongside numerous other subjects related to economically important plants.

Genetics, genomics and bioinformatics

It's an Australian icon, and its genetic sequence has just been unveiled. Last year, Eucalyptus grandis became the first Australian plant, and only the second ever tree, to have its genome sequenced. Some of the details of the Eucalyptus genome will be discussed at this symposium, from its evolutionary relationships to its defence capabilities.

The number of plants joining Eucalyptus on the "sequenced" list is continuing to accelerate, thanks in large part to massively parallel DNA sequencing techniques, which can produce over a billion base pairs of data per day. The scientists who are applying this revolutionary technology to a diversity of plant genomes will present their work as part of Theme 3.

But it's not just the genetic code that will be discussed. Epigenetics – heritable information stored not within the genome sequence but as molecular annotations to DNA strands – is now an established theory, and laboratory-based mechanistic understanding of epigenetics in model organisms is expanding rapidly. An array of scientists will discuss the theoretical evolutionary implications of epigenetics, using empirical data to illustrate their arguments.

Physiology and Biochemistry

Until recently, most biologists saw water transport in plants as a topic for the textbooks. Research over the last 15 years has thoroughly upended this view, turning plant hydraulics back into a vibrant field of research. The emerging details of the way plants transport water – for example, the delicate interaction between living and dead cells in the xylem – will be one of the topics discussed under Theme 4.

Plant physiology and biochemistry are also providing clues as to the emergence of C4 photosynthesis – a topic of interest for boosting crop production. Only around 4% of the world's plant species fix CO_2 via the specialized C4 pathway, yet they contribute about 20% of global primary productivity, thanks to the CO_2-concentrating mechanism they operate in their leaves. The C4 photosynthetic pathway is strongly represented in the grass (Poaceae) family, comprising about 50% of total grasses. Examining these species is offering new insights into the C4 evolution and ecology.

It's not just botanists that are interested in plant physiology – product designers are also starting to take note. In the course of evolution, plants have developed a hierarchically organisation on at least five levels: in the stem; the tissues; the cells; the cell wall structure; and the biochemical level. These hierarchies are behind properties from benign fracture behaviour to heat insulation to actuation. Analysing the hierarchical organisation in plants is a major part of assessing the potential for technical implementation.

Structure, Development & Cellular Biology

When it comes to structure, orchids are a particularly varied bunch. Next year marks the 150th anniversary of the publication of Charles Darwin's book, 'On The Various Contrivances by Which Orchids Are Fertilised By Insects '. Since Darwin's time, technology, experimental techniques and evolutionary hypotheses have of course moved on, and a symposium as part of Theme 5 will address some of the more recent advances in orchid-pollination, from the biochemistry of orchid fragrances to conservation in the age of global warming.

In the wider plant world, nectar is the most frequent type of floral reward that animals are offered in return for assistance with pollination. Nectar is thought to have evolved early in the history of flowering plants, and recent discoveries shows just how complex it can be. It can incorporate an extraordinary variety of substances, from complex proteins to aromatic volatiles, and has evolved functions far beyond the attraction of pollinators.

Systematics, Evolution, Biogeography & Biodiversity Informatics

Flowering plants dominate most terrestrial ecosystems, and are of major importance for mankind as a source of food and countless other products we depend on in our everyday lives. Yet even for this essential plant group, only fragments of its evolutionary history are well understood.

Addressing outstanding questions on plant evolution, biogeography and biodiversity – and the role of systematics and informatics in unravelling them – will be a key part of Theme 6. The complexity of the questions involved mean researchers from a wide variety of disciplines will be involved.

DNA barcoding, the identification of species specific genomic markers, is one area poised to revolutionise biodiversity discovery and identity. A number of large-scale DNA barcoding activities are already underway, details of which will be one of the areas discussed.

Technology is also helping to tap botany's vast back-catalogue. Historical collections, from specimens, literature, field notes, and geographical materials, are essential for streamlining the use of botanical names, for example. For the first time in history it is possible to aggregate all required information in a virtual environment.

Plants In Society

People rely on plants, for food, medicines and other practical uses but also in less tangible ways. Around the globe, our ancient relationship with plants is reflected in mythology. All cultures have some myth or tales related with nature and humans, with Greek mythology and its Roman version particularly rich with stories where characters metamorphose into plants.

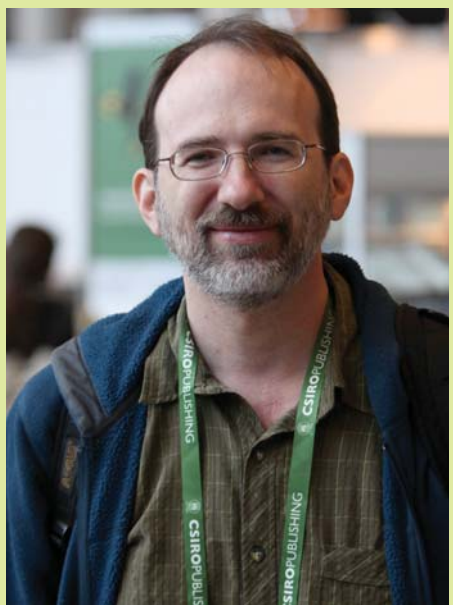
These myths have had a particular influence on botanists – a topic discussed as part of Theme 7. For example, many mythological characters appear within botanical taxonomy, from Achillea for Achilles, Eragrostis for Eros, Asclepias for Asclepius. And myths have similarly been the inspiration for botanical terms, such as hermaphroditic from the Hermaphroditus tales.

But confusions have also arisen. Artistic recreations of ancient tales during the Renaissance and Neoclassical periods sometimes were adjusted to modern life and consequently confusions. The hyacinth, for example, played no part in the original myth of Hyakinthos, for example, and was only introduced by later painters.

Faces and voices from around the world

Aimee Bourne is six months into her PhD in the Hawkesbury Institute for the Environment at the University of Western Sydney (NSW, Australia). As well as helping to staff the Hawkesbury Institute stall here at IBC 2011 (Booth 2), Aimee presented findings from her recently completed honours degree to Symposium 49 (Plant hydraulic systems, Monday afternoon). Aimee's data, on water use and transpiration in four eucalypt tree species, has yet to be published. "I want to get feedback from the experts here first", says Aimee.

Botany professors **Dr S. Padmavathy** (left) and **Dr R. Jayakumararaj** (right) have come to Australia for the first time, from Tamil Nadu in India. Dr Padmavathy is representing Nirmala College for Women in Coimbatore, while Dr Jayakumararcy researches traditional medicine at R.D. Government Arts College in Sivagangai.



Kenneth Wurdack, a Research Botanist from the Smithsonian Museum in Washington DC (USA), wouldn't miss an IBC for the world: "It's the Olympics of botany", he declares; "It's expected of my profession to attend." The symposia of most interest to Kenneth were on Monday, but unfortunately several of them happened at the same time in different rooms. He and other delegates have had to choose between competing parallel talks.

Carlos Lehnebach is originally from Chile, but now works at the Museum of New Zealand Te Papa Tongarewa in Wellington, New Zealand. His passion is forget-me-nots and orchids: "I read recently that you can quit women, or men, or cigarettes or alcohol", quips Carlos, "but orchids are forever!"

Liza Smith, from the University of Wollongong, has just finished an honours degree in invasive species and their impact on host species. Invasiveness is still her research focus, but the second plenary sessions on Monday morning expanded her horizons: "I'm also getting interested in agronomy and food security now", she says.

IBC2011 public events

The World of Plants

Tuesday 26 July, 6:30pm, Plenary Hall, Melbourne Convention and Exhibition Centre.

Professor Peter H. Raven, Missouri Botanical Garden, USA, will discuss:

- At least 400,000 species of flowering plants exist, the great majority of them poorly known, with perhaps 20% of the species and a much higher proportion of the genetic diversity threatened with extinction over the next decade or two and probably more than half by the end of the century.
- The future depends on learning about them and disseminating the information efficiently, conserving natural areas in the face of growing adverse changes, building seed banks, and educating people to know and love what they are losing.

Brave New World—can we solve tomorrow's environmental and energy problems by using life itself?

Wednesday 27 July 2011, 12:30-1:30pm Melbourne Convention and Exhibition Centre.

A forum moderated by Robyn Williams, ABC Science Show. Studying life in all its forms is exciting at this time of great technological change. Computers and modern scientific techniques have provided us with an understanding of life processes at the molecular level in a way never before possible.

Yet we know little about the unicellular organisms that make up most of the Tree of Life. Much of our scientific research efforts and investments go into the study and conservation of relatively few multicellular creatures and ecosystems. Research on the rest of life focuses mostly on controlling harmful microorganisms rather than looking for useful ones.

Is the time right to prioritise research into useful microbes, harnessing them to convert significant amounts of CO2 into biomass and biofuels and to capture and store significant amounts of carbon to slow climate change? Plants feed us and nature sustains us but could microorganisms give us the 'biggest bang for our buck'?

Speaking for the plants:

- Prof. David Mabberley, Royal Botanic Gardens, Kew, UK, and soon to be Executive Director of Sydney's Botanic Gardens Trustr
- Dr Kevin Thiele, Curator, Western Australia Herbarium

Speaking for the microbes:

- Dr Jeff Powell, Microbial ecologist and lecturer, University of Western Sydney
- Dr Kirsten Heimann, Cell biologist and biofuels expert, James Cook University

Sister Water Lily meets the Big Bad Banksia Man - Can a whimsical and largely discarded branch of illustration be used to reinvigorate botanical education?

Thursday 28 July, 6:30pm, Plenary Hall, Melbourne Convention and Exhibition Centre

Dr Peter Bernhardt, Saint Louis University, USA, and his co-author Retha Meier review the works of C.M. Barker (England), W. Crane (England), May Gibbs (Australia), J.J. Grandville (France) and M.T. Ross (America).

All produced detailed illustrations featuring anthropomorphic flowers, stems and edible plants. The tragic J.I.I. Gerard (a.k.a. Grandville, 1803-1847) began this trend in floral fantasy to amuse a mature audience of sophisticated Parisians but his techniques were assimilated by later author/artists of children's books.

Peter Bernhardt is a Professor of Biology at and a Research Associate of the Missouri Botanical Garden (St Louis) and the Royal Botanic Gardens, Sydney. Research in the Bernhardt/Meier laboratory concentrates on flower evolution and the pollination systems of rare and threatened plants in North America, Australia and China. Peter is the author/co-author of 75 reviewed journal articles and four popular books on plant life including 'Wily Violets and Underground Orchids' (1989) and 'Gods and Goddesses in the Garden' (2008). He has a keen interest in how plants have been incorporated as characters in children's literature.

The Atlas of Living Australia: infrastructure for biodiversity research

Friday 29 July, 6:30pm, Plenary Hall, Melbourne Convention and Exhibition Centre

Dr Donald Hobern, Atlas of Living Australia, CSIRO Entomology, Australia discusses:

The Atlas of Living Australia is a national initiative focused on making Australia's biodiversity information more accessible and useable online. In short, 'an online encyclopaedia of all living things in Australia'. The Atlas website already holds more than 23 million distribution records for Australia's fauna and flora, integrated with over 300 environmental layers for mapping and analysis. The Atlas enables researchers to provide policy and decision makers with targeted and useful information, presented in accessible ways. Members of the public can contribute sightings and photos of species and help to build a more complete picture of Australia's biodiversity. Funded by the Australian Government, the Atlas is a collaboration between CSIRO, Australia's national science research agency, and more than 60 biological collections from Museums and Herbaria, Federal and State Departments, universities and microbial collections.

Posters on parade

Session 1 (RF091):

Maria Fernanda Calió, University of São Paulo, Brasil

New Insights into the Generic Circumscription of Helieae (Gentianaceae)

Helieae is a tribe within Gentianaceae endemic to the neotropics, made up of 23 genera and over 200 species – but how are they all related? New DNA sequence data sheds light on the question.

Mauricio Diazgranados, Saint Louis University, USA

Interactive Digital Key for the Frailejones (Espeletiinae Cuatrec., Asteraceae) of the South American Páramos

The high elevation grassland ecosystem of the Northern Andes, known as páramo, is the most diverse high elevation ecosystem in the world. What are the patterns and mechanisms of speciation there, and how will it be affected by climate change?

Kerry Gibbons, University of Sydney, Australia; National Herbarium of NSW, Sydney, Australia

Australasian Loganiaceae: molecular phylogenetics and biogeography of Loganieae

Loganiaceae is a predominantly tropical to subtropical family, with Australia being an area of high generic diversity. The group provides an excellent model with which to explore the biogeographical history of the Australasian region.

Bee Gunn, Australian National University, Canberra, Australia

*Genetic diversity and phylogeography of wild-sown and cultivated coconuts (*Cocos nucifera *L.)*

Coconuts are adapted to drift-dispersal by ocean currents; however, human activities continue to aid its spread and impact its phenotypic and genetic structure. We have investigated the genetic diversity of coconuts, including the impact of domestication.

Yan Hou, University of Oslo, Norway

Searching for the Roots of the Arctic Flora: Biogeographic Connections to the Himalayas

What is the origin of arctic flora? Did a local species persist and adapt to the cold and open habitat, or did pre-adapted species immigrate from southern alpine regions? State-of-the-art molecular phylogenetic and phylogeographic methods could help to reveal the answer.

Priyanka Ingle, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, India

Terminalia procera *Roxb.- a distinct species than* Terminalia catappa *L.*

Detailed morphological, anatomical and dermatological studies reveal that the plants popularly known as Deshi Baadaam and Safed Bombay are two distinct species.

C. Haris Saslis-Lagoudakis, University of Reading, UK

Repeated transoceanic long-distance dispersal in the history of the pantropical genus Pterocarpus *(Fabaceae: Dalbergieae)*

DNA sequence data, calibrated using fossil and secondary data, reveals that the pantropical genus *Pterocarpus* has undergone at least four independent transoceanic, long-distance dispersal events in its history.

Satoshi Kakishima, Botanical Gardens, University of Tokyo, Japan

Asymmetrical Hybridization Between Monocarpic Mass-flowering Shrub And Polycarpic Perennial Herb In Strobilanthes *(Acanthaceae)*

Several species of *Strobilanthes* have a plietesial life history –almost all individuals simultaneously flower, set seed and die once every three to sixteen years. Studying natural hybridization between species with different life histories can reveal the role of life histories as reproductive isolation.

Kyoko Sugai, Tokyo Metropolitan University, Japan

Genetic Structure of Symplocos *(Symplocaceae) in the Bonin (Ogasawara) Islands Using Microsatellite Markers*

The entire flora of the isolated Bonin (Ogasawara) Islands, 1,000 km south of Japan in the Pacific Ocean, has formed from a few immigrant species arriving by sea. Genetic variation within species now growing on the islands, which is expected to be very low, can be assessed by microsatellite markers.

Shizuka Tsuneki, Tokyo Metropolitan University, Japan

Detecting initial stage of ecological speciation in the genus Persea *on the Bonin Islands, Japan*

The Bonin Islands are very small, covering just 73 km^2. However, various types of environments, from dry shrubs to wet forests, exist there. The genus *Persea* is one of the genera in which adaptive radiation has occurred on the islands.

Michael Whitehead, Australian National University, Australia

The mating habits of Chiloglottis *orchids*

Chiloglottis orchids secure pollination by sexual deception, attracting male insect pollinators by mimicking specific sexual signals. By hijacking pollinator behaviour, sexually-deceptive plants such as *Chiloglottis* orchids ensure their pollen is transported far enough away from the parent plant to promote outcrossing.

Bine Xue, University of Hong Kong, China

Segregation of the Polyphyletic Genus Polyalthia *(Annonaceae)*

The species-rich genus *Polyalthia* has long functioned as a 'dustbin group' for species of unclear affinities. A much broad taxonomic sampling of *Polyalthia* species and associated taxa has enabled the recognition of genera with clearly defined diagnostic morphological characters.

Firman Alamsyah, University of Tokyo, Japan

Molecular Phylogenetics of Nepenthaceae Based On Internal Transcribed Spacer (ITS) DNA Sequences

Nepenthaceae is a 120-species family of pitcher plants with only one genus, *Nepenthes*, which occur mainly in Southeast Asia. Studying the ITS region of various *Nepenthes* species can help to reveal the different taxa within the genus.

Lukasz Banasiak, University of Warsaw, Poland

Reconstruction of Ancestral Pollen Morphologies Aids Calibrating of the Phylogenetic Tree of Apiaceae Subfamily Apioideae (Magnoliophyta, Apiales)

For many groups of angiosperms, fossil data of their early representatives are scarce, and their assignment to extant lineages is problematic. Evolutionary analyses of extant and fossil pollen data could offer a way around the problem.

Session 2 (RF02):

Christina Borzak, University of Tasmania, Hobart, Australia

Investigating a genetic basis to physiological responses of Eucalyptus globules *seedlings to defoliation*

Eucalypt seedlings have a remarkable ability to recover after mammalian browsing damage, including increasing their photosynthetic capacity. We investigated the genetic basis to variation in growth and physiological responses of *E. Globules* seedlings to artificial leaf loss.

Beatriz Fernández-Marín, University of the Basque Country, Spain

Violaxanthin cycle can be activated in darkness by stresses such as desiccation and anoxia

The violaxanthin cycle is usually activated by light in plants and algae. Here other stressors that may trigger violaxanthin de-epoxidation in darkness, from desiccation to immersion, are characterized in the brown intertidal alga *Pelvetia canaliculata.*

Keina Monda, Kyushu University, Japan

Environmental regulation of stomatal response in Arabidopsis *Cvi-0 ecotype*

Genetic mutants can be a powerful tool for understanding stress sensitivity among plants - but this approach usually targets one gene at a time, and environmental stress tolerance involves a multiple genes. *Arabidopsis* is an ideal model for studying the effect of complex genetic variation on stress tolerance.

Adne Righi, University of São Paulo, Brazil

Chemical Characterization of Brazilian Propolis by HPLC-MS and GC-MS: the Black, Red, and Green Brazilian Varieties of Propolis

Propolis is a complex honeybee product made up from beeswax and plant products. Its colour, texture and chemical composition depends on hive location and local plant population. We have profiled the chemical composition of nine samples of propolis, corresponding to seven regions of Brazil.

Marina Corrêa Scalon, Macquarie University, Australia

*Host Phenological Behaviour Affects Water Relations of a Mistletoe (*Phthirusa ovata *(Pohl) Eichler - Loranthaceae) in the Savannas of Central Brazil*

Several mistletoes species are known to grow and reproduce on both deciduous and evergreen host plants, which suggests a degree of plasticity. We have studied some of the different strategies used by mistletoe species growing on deciduous and evergreen hosts.

Arvind Dhabe, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, India

Seed Anatomy of the Genus Alysicarpus Desv.

Alysicarpus Desv. is a small, 27 species genus of the Fabaceae family, 17 species of which call India home. Studying the anatomical features of their seeds reveals that anatomy varies not only between species. Varieties and forms also have specific seed anatomy.

Christina Lord, Dalhousie University, Canada

Organelle Tracking During Environmentally Induced and Developmentally Regulated Programmed Cell Death (PCD) in the Model Species Aponogeton Madagascariensis

The lace plant, *Aponogeton madagascariensis*, gets its name from the characteristic holes that form in its leaves. These perforations are the result of regulated programmed cell death (PCD), but PCD can also be environmentally regulated, and the lace plant can be used to probe the difference.

Olivier Taugourdeau, UMR AMAP, Montpellier, France

Plant architecture: from concepts to applications

Architectural analysis is essentially a detailed, multilevel, comprehensive and dynamic approach to plant development. In 2007, Barthélémy & Caraglio published a review on plant architecture which provides generic terminology and the concepts for plant architecture interpretation, and we will illustrate some applications of the main concepts.

Yukiko Yamada, Kyoto University, Japan

Living wood fibres act as starch storage and transport pathway in black locust (Robinia pseudoacacia)

Most wood fibres complete cell wall formation and then die before the dormant period. In some species, however, wood fibres retain their living protoplast for months or years – including the black locust, where almost all wood fibres in the outer part of the annual ring are living.

Xiaofeng Yin, Miami University, USA

Phyllotactic Transitions in Diphasiastrum digitatum

Among megaphyllous taxa, Fibonacci patterns are prevelant – but for at least one microphyllous species, the pattern isn't observed. If this observation is found to be more widespread, this would suggest that a different mechanism governs microphyllous phyllotaxis, a possibility that we are further exploring.

Tina Sehrish, Massey University, Palmerston North, New Zealand

Cyto-nuclear interactions in Tragopogon *(Asteraceae) Allopolyploids: insight from rbcL and rbcS*

The gene products from the organelle genomes of the chloroplast and mitochondria can interact with nuclear gene products in a variety of pathways. Most protein complexes consisting of multiple subunits have proteins encoded by both nuclear and organellar genomes – including RuBisCO, studied here.

Ashley Hwei-Ting Tan, University of Adelaide, Australia

Investigating the Roles of Barley CesA Genes in Cell Wall Biosynthesis

Barley contains at least eight cellulose synthase (CesA) genes. Some are associated with primary cell wall synthesis, while others are more likely to be involved in the synthesis of secondary cell walls. A gain-of-function approach was used to study the roles of the CesA genes in barley cell wall biosynthesis.

Sayuri Tsukahara, National Institute of Genetics, Japan; Graduate University for Advanced Studies (SOKENDAI), Japan

Centromere-specific Integration of Copia-type LTR Retrotransposon in A.lyrata

Retrotransposons are major component of plant genome. No mobile retrotransposon with targeted integration has been previously found in plants. Here, we directly show targeted integration of a mobile retrotransposon from *A. lyrata* into centromeric repeats in the *A. thaliana* genome.

Botany in the news

All aboard the Melbourne Express

Australian Garden wins Gold at Chelsea Flower Show

An Australian garden, with its roots here in Melbourne, recently won a gold medal at the world's most famous garden show – The UK Royal Horticultural Society's Chelsea Flower Show, May 2011. The winner of the Show Garden category was based on the multi award-winning Australian Garden at the Royal Botanic Gardens Cranbourne, a division of the Royal Botanic Gardens Melbourne.

Show garden designer Jim Fogarty used specialised Australian plant species to tell the story of "the journey of water" – from the arid outback to the wetter, urban east coast of Australia. Fogarty's creation featured almost 2,000 native Australian shrubs and trees, including endangered species that have rarely (if ever) been seen before at Chelsea. Threatened seeds, collected as part of the Victorian Conservation Seedbank partnership, were shipped from Melbourne to the UK and grown especially for the show garden.

Dr Philip Moors, Director and Chief Executive of the Royal Botanic Gardens Melbourne, said "We're honoured to accept the gold award at Chelsea. The reaction from visitors to the show has been universally complimentary and we've been inspired by the enthusiasm and interest in our plants and gardens. This is a tremendous accolade for Australian horticulture and design."

The show garden's inspiration, the Australian Garden in Cranbourne, demonstrates how Australian native plants can be used to create sustainable home gardens. Entry to the nine hectare garden in Cranbourne is now free of charge. The garden can be reached by taking the Cranbourne line train from any City Loop station in the centre of Melbourne, or IBC 2011 delegates can join a tour:

Wednesday 27 July 2011

Time: 12:30pm – 5:30pm

Departure: Hilton South Wharf Hotel

Return to: Hilton South Wharf Hotel

Cost: $40.00

For more information, visit www.rbg.vic.gov.au/australian-garden.

DON'T MISS THE CONGRESS GALA

GARDENS OF THE WORLD

Experience various cultures of the world as you feast on iconic dishes. Enjoy Australian bush-tucker in a truly Australian scene, Chinese food prepared and served from pagodas, expertly sculpted sashimi in the Japanese Garden and taste the wonders of Africa in the Game Park. The evening will be the highlight of the social program and a rare opportunity to experience the flavours, aromas and sights of the world – a true expression of Melbourne's culinary, floral and artistic diversity.

Date: Wednesday 27 July 2011
Time: 1900 – 2300
Dress: Smart casual
Venue: Melbourne Convention and Exhibition Centre
*Tickets: Delegates and Students AUD$66**
*Accompanying Persons AUD$88**
*Additional Tickets AUD$88**
** Tickets are limited. Please see the Registration Desk.*

PLANTS AND PEOPLE

Free public evening lectures and a lunchtime panel discussion as part of the XVIII International Botanical Congress. Come and listen to experts on these subjects, and ask them questions afterwards

- **What do plants do for us? What can we do for plants?**
- **What will climate change do to our favourite wine-growing areas?**
- **How important are plants and microbes to us?**
- **How can we conserve and use them sustainably?**
- **Sister Waterlily meets Big Bad Banksia Man: the role of plants in children's stories and teaching children about the natural world**
- ***Atlas of Living Australia* – an online encyclopedia of all living things in Australia**

Venue: Plenary Hall, Melbourne Convention and Exhibition Centre, Southbank, Melbourne

25 July 1830–2000 *Fruits of the vine – future climates and wines*
Prof. Snow Barlow

26 July 1830–2000 *The world of plants* Prof. Peter Raven

27 July 1230–1330 *Brave New World: can we solve tomorrow's environmental and energy problems by using life itself?*
Panel: Assoc. Prof. Kirsten Heimann, Prof. David Mabberley, Dr Jeff Powell, Dr Kevin Thiele; moderator Robyn Williams

28 July 1830–2000 *Sister Water Lily meets the Big Bad Banksia Man*
Prof. Peter Bernhardt

29 July 1830–2000 *The Atlas of Living Australia*
Donald Hobern

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