Phytogen March 2016

Conferences and employment opportunities

28 March 2016

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Two conferences were recently added to the Australian Society of Plant Scientists website;

22nd International Plant Growth Substances Association (IPGSA) meeting

ComBio2016

and a further two employment opportunities;

2017 Graduate programme

Graduate – ABARES Entry Level Professional Programme

ComBio2016: 3-7 October 2016 Brisbane

28 March 2016

ComBio2016: 3-7 October 2016 – Brisbane Convention & Exhibition Centre

ComBio2016 is a combination of the ASBMB, ASPS and ANZSCDB Annual Meetings

Early Registration & Abstract Deadline: Monday, 27 June 2016

Dear ASPS Past and Present Members

We are pleased to advise that the ComBio2016 overseas plenary speakers are now finalised. Overseas plenary speakers can be viewed at: http://www.asbmb.org.au/combio2016/plenary.html Photographs and biographies of these prestigious scientists will be added to this page as they become available. The latest advertisement for the conference which includes the overseas plenary speakers and the conference themes can be downloaded from: http://www.asbmb.org.au/combio2016/

We would be most grateful if you could download a copy of this advertisement, distribute to colleagues and pin on your departmental noticeboards.

Online registration and abstract submission forms will be available in mid to late April, and we will contact you again at that time. The provisional program timetable and the symposium schedule will also be available for perusal around this time.

Further information: Sally Jay: combio@asbmb.org.au"

Leaf respiration in a warmer world is substantially lower than previously thought

22 March 2016

By Sebastian Pfautsch

ASPS Representative 'Environment and Ecophysiology: Global Change'

Hawkesbury Institute for the Environment, Western Sydney University

Every year plants respire about 64 Gt CO_2 back into the atmosphere. That is six times as much as released from burning fossil fuels. Obviously, small proportional changes in the respiratory flux can result in dramatic changes in atmospheric CO_2 concentrations and associated warming effects.

Plant respiration (R) is positively correlated to temperature (T). Plant scientists have believed that R will accelerate under global warming, generating a feed-forward loop where plant-respired CO_2 leads to even faster rates of warming, that lead to even greater fluxes of R and so on. Clearly, this scenario, where plants are responsible for faster rates of global warming is a scary one. Should plants be put into the limelight of being irresponsible climate sinners? Have plants worked out an evil plan to overthrow *Homo sapiens*? Are we all working for the enemy?

Rest assured, the short answer is no. The slightly longer answer, according to plant ecologist Peter Reich is "that we have no silver bullet to stop global warming, but recent research on the temperature-R relationship provides a silver lining in an otherwise dark sky".

Recently Peter published new research findings on plant R in *Nature (http://www.nature.com/nature/journal/vaop/ncurrent/full/nature17142.html)*. He and his team grew 10 North American tree species for five years in the field and measured an insane amount of R-to-T response curves of leaves. Trees were grown under ambient and warmed (+3.4 °C) conditions with and without canopy cover of dominant trees. When leaves of ambient trees were exposed to +3.4 °C warming for a short time, their rate of R increased by 23% compared to unwarmed leaves.

However, when R was measured in leaves that were constantly warmed, they respired 80% less than those plants that experienced only short-term warming. This indication of long-term acclimation of R to higher T has large implications for global simulation models that – until now – have falsely assumed that R increases exponentially when T is rising. Consequently, these models have grossly overestimated atmospheric concentrations of CO_2 and associated rates of global warming.

Independent of the research in North America, two other studies have emerged that point in the same direction. A global team, spearheaded by colleagues from ANU (Heskel et al., 2016, published in *PNAS*) found that R did not increase exponentially as T rose along an environmental gradient reaching from the artic to equatorial biomes and covering 231 plant species. Most importantly, the shape of the response curve of R-to-T was similar for all species, pointing to a universally applicable sensitivity of leaf metabolism to T. Earth system modellers must have a field day as these results make life so much easier…

The second study I'd like to point out is the work by John Drake and colleagues, accepted for publication in *New Phytologist*. This work brings R-to-T responses home to *Eucalyptus* trees. 12 Forest Redgum trees were grown in 10 m tall whole-tree chambers in Richmond, of which half tracked ambient temperatures, the other half ambient +3 °C warming. Instrumentation of the

chambers allowed John to track gas exchange of the trees on a day-to-day basis at high temporal resolution.

Results from these Redgums agreed with Peter's work on North American trees. R did not increase with warming. Furthermore, the Redgums responded to warming by decreased photosynthetic carbon assimilation. This means that – although indirectly – warming may increase atmospheric CO_2 concentrations, but not due to increased R rather than decreased assimilation of C. In the experiment this led ultimately to a small increase in the ratio of R-to-photosynthesis, but only during heatwaves.

John says "these gum trees happily adjusted their physiology to cope with warming during most conditions, but heat waves were different. The gums shut their stomata and waited out the heat, but in the process they lost a lot of C to respiration without gaining any via photosynthesis". In a global warming perspective this means that higher atmospheric CO_2 concentrations could be the result of decreased uptake of CO_2 by trees during the more frequent and intense heat waves predicted for our future in Australia.

The capacity of plants to acclimate to higher temperatures without exponentially increasing R is great news for the modelling of the earth system. As Peter puts it, acclimation of R to temperature only represents "a delay in the race to the climate change cliff". However, we must consider that ecosystem R is much more than leaf R. At least John's paper reports R of the woody proportion of trees (R is slightly increasing with warming). Leaf R represents roughly 50% plant R, with fine roots being responsible for the majority of the other half. We know little about acclimation of R in fine roots.

We know even less of acclimation of R in soil microbial biomass. And on a ecosystem scale consider that: while under hot and dry conditions plants would close stomata, leading to reduced uptake of CO_2 while R remains relatively constant, soil microbial activity would slow down, autotrophic R would decrease and soils would retain more C. How does that affect atmospheric concentrations of CO_2?

It gets complicated really quickly if we leave experimental units and enter the real world where plants have to deal with competition for resources (e.g. light, water, nutrients), grow fast or slow, tolerate shade more or less, age, etc. And on top of all that, even one of the world's most distinguished plant ecologist admits that we don't even know how acclimation exactly modifies enzymatic and biochemical processes. Nevertheless, pushing the boundaries of our understanding of R-to-T responses remains important work.

The seminal work of Owen Atkin and Mark Tjoelker 13 years ago (published in *TiPS*) defined the current framework of leaf acclimation. The three most recent studies about R-to-T responses and their implications to the earth system are tribute to an ever-progressing understanding of the effects of global warming on the natural world.

And besides all the great results, the work by Reich, Heskel and Drake and their colleagues is proof of the importance of well-funded, long-term and field-based research programs – a type of plant science that is pushed towards extinction. So, are plants winning after all? Take a deep breath and … respire.

Call for ASPS Robertson Travelling Fellowships for 2016

15 March 2016

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Announcing the call for applications for second round ASPS Robertson Travelling Fellowships award 2016;

2016 RN Robertson Travelling Fellowships, Round 2 applications close **April 30th 2016**.

Employment opportunity and February Global Plant Council E-Bulletin

11 March 2016

Your current membership is paid to [wpmlfield name="paidtodate"] (year, month, day)

New employment opportunities are available at King Abdullah University of Science and Technology Saudi Arabia

Global Plant Council E-Bulletin February 2016

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E-Bulletin /
February 2016

Welcome to your monthly e-Bulletin from the Global Plant Council! As usual, this newsletter provides an overview of some of the new and fascinating plant science going on around the world, as well as details of new reports, funding opportunities, events and other information we thought you might find useful.

Don't forget to check out our website, blog and social media channels for even more content, and if you have any questions, comments or feedback for us then please send us an email!

Latest News /
View more... If you have news you would like us to share on our website, please contact lisa@globalplantcouncil.org

New Phytologist Trust

This month 58 new breaking news stories were posted on the GPC website including...

In *Nature Plants*: Ancient flowering plant was beautiful, but probably poisonous

Researchers have announced the discovery of the first-ever fossil specimens of an "asterid" – a family of flowering plants that gave us everything from the potato to tomatoes, tobacco, petunias and our morning cup of coffee.

In *New Phytologist*: Study documents drought's impact on redwood forest ferns

A comprehensive study of water relations in native ferns, conducted during one of the worst droughts in California's recent history, shows that extreme conditions have tested the limits of drought tolerance in these plants.

High resolution insights into how roots grow

Researchers in Frankfurt have used a high-tech optical microscope and computer simulation analysis to conclude that, in Arabidopsis, root shape is determined by a combination of genetic predisposition and the self-organization of cells.

A new role for vitamin B6 in plants

Researchers from the University of Geneva, Switzerland, have discovered an unexpected role for the micronutrient vitamin B6, in relation to nitrogen metabolism.

Finding the best seeds to meet Africa's needs

A new coordinated soybean variety evaluation program is underway that will give African growers more and better seed options.

Events /

View more... If you have a conference, meeting, workshop, training course

or other event coming up, we can include it in our Events calendar! Please email lisa@globalplantcouncil.org

Plant Reproduction 2016: 24th International Congress on Sexual Plant Reproduction
18–23 March 2016. Tucson, Arizona, USA. UK Plant Sciences Federation Conference: PlantSci 2016 – Plants in a changing world: molecule to ecosystem
11–12 April 2016. Norwich, UK.

International Conference on Pulses for Health, Nutrition and Sustainable Agriculture in Drylands
13–15 April 2016. Rabat, Morocco.

Reports /

New reports, and an archive of useful documents from the last few years, are available on our website. Head to the Resources page and click 'Reports'.

BREXIT and Agriculture (PDF)
Ahead of a referendum in June 2016, this report by the UK's Farmer–Scientist Network discusses the potential impact on agriculture of Great Britain's exit ("BREXIT") from the European Union.
More...(PDF)

Funding Opportunities /

Spotted a funding opportunity we've missed? Please tell us about it by emailing lisa@globalplantcouncil.org

This month we found some new funding opportunities, including the David Miller Travel Bursary Award for young plant scientists or horticulturalists from the UK and Ireland, travel and conference funding from the Australian Academy of Science Research, and the Bayer Foundation International Fellowship Program.
More info...Congratulations also to Detlef Weigel, who has been awarded the 2016 GSA Medal of the Genetics Society of America.

On the blog /

View more...Would you like to contribute an article to the GPC's blog? Please get in touch! Email lisa@globalplantcouncil.org

Flowers of the Global Plant Council

Following on from December's *GigaScience* post about sequencing the genome of Hong Kong's national flower, Amelia Frizell-Armitage takes a look at some of the other national plants of our member organizations' home countries.

More...Integrated Pest Management Systems

What is integrated pest management (IPM), and how is it achieved? All is explained in this GPC blog post.

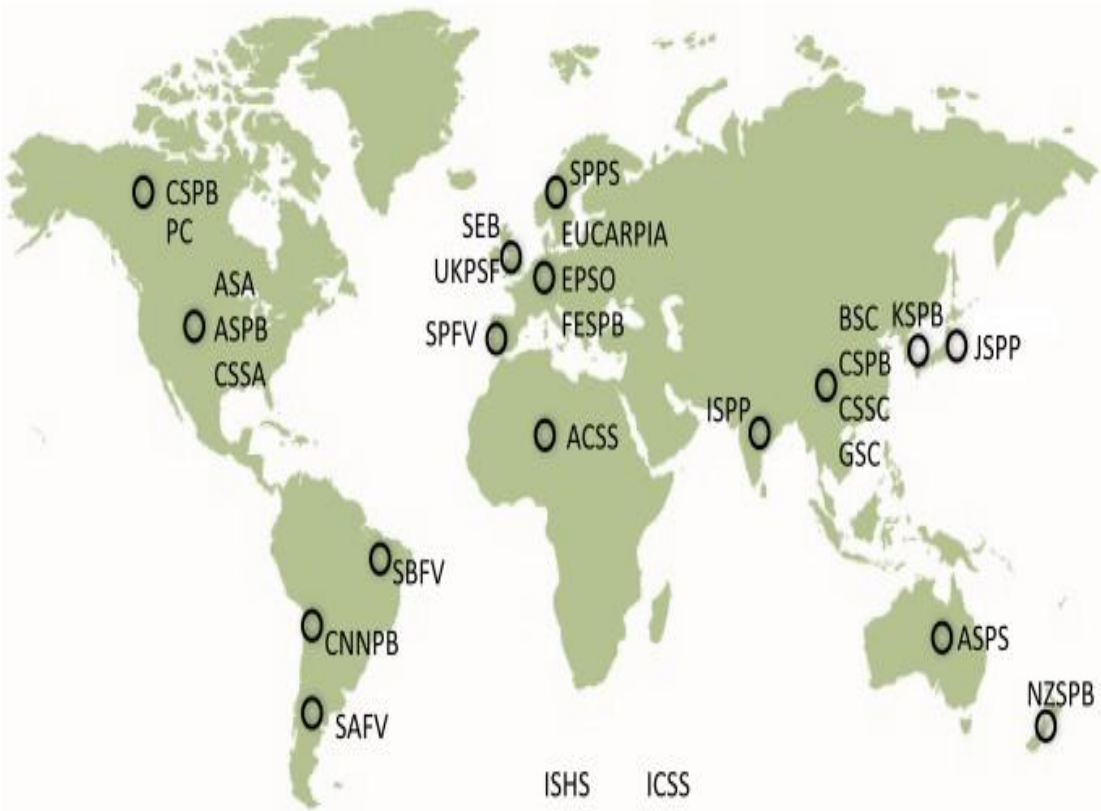
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Plant Artificial Chromosome Technology

Could artificial chromosome technology transform plant genetic engineering? Find out more about this emerging technology.

More...

Members /



Click here for details of the GPC Member Organizations and representatives.

Please contact Ruth Bastow (ruth@globalplantcouncil.org) to find out how your organization can join the Global Plant Council.

The GPC is a coalition of plant and crop science societies from across the globe. The GPC seeks to bring plant scientists together to work synergistically toward solving the pressing problems we face.

Please click here to make a donation via PayPal to help support the GPC.

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Science meets Parliament 2016 report

09 March 2016

by ASPS student member Hannah Osborn (@han_osb321)

The sixteenth Science meets Parliament was held in Canberra last week, an event where over 200 scientists descend on Parliament House to learn about politics, policymaking and the media. I was fortunate enough to represent the Australian Society of Plant Scientists alongside Professor Yong-Ling Ruan from the University of Newcastle.

This annual event organised by Science and Technology Australia (STA) is a great opportunity for scientists to inform and excite politicians about science and at the same time learn about politics and the policy, media and parliamentary processes.

The event is held over two days the first day is to prepare us for meeting the politician, the second day is actually meeting them. Professor Brian Schmidt was up first offering many pearls of wisdom from his experiences dealing with politicians. Top tips included “Don’t get defensive”, “Don’t whinge or complain about lack of funding” and remember they’re human! We then heard from journalists Paul Bongiorno and Alison Carabine about the role of media in science. This session covered the importance of being engaging and communicating your science in a simple and direct way. The responsibility of the media to provide alternative views was also discussed with the emphasis on issues like climate change and vaccinations. Both journalists agreed that

the alternative view should be proportional to the public interest. I believe the media could have more responsibility here in presenting scientific facts over the “conspiracy theories” but it shows how important it is to clearly and simply communicate your science for the public to make an informed decision.

Following this Catriona Jackson, CEO of STA chaired the session “Getting into policy: how to use science to shape public policy” with Professor Emily Banks, ANU and Dr Subho Banerjee, Department of Education and Training. This was a really interesting session covering the importance of policymakers and how politicians are actually really interested in science, we’re “pushing on an open door” and we need to make the most of this.

The afternoon session was spent working out what to expect from Science meets Parliament by a panel comprising Dr Jeremy Brownlie, STA, Professor Mark Hutchinson, ARC Centre of Excellence for Nanoscale BioPhotonics, Dr Krystal Evans, BioMelbourne Network and Catriona Jackson, STA. The key message here was to make sure you have a key message when speaking with the politician and to know what you want out of the meeting, which could range from informing the politician of your science to inviting them to visit and see firsthand what goes on within your workplace.

Your science in 60 seconds was the interactive final session of the afternoon where Dr Rod Lamberts and Dr Will Grant both from ANU set a strict time limit for us to tell our science story. In a competitive elimination process where only the best moves forward to win a metaphorical bottle of wine all 200 of us got to practice communicating our science succinctly. Actual wine followed at the Gala dinner that night at Parliament House with Minister Christopher Pyne and Opposition Leader Bill Shorten both speaking about the importance of science and innovation.

The second day of Science meets Parliament involved actually meeting a politician. Personally, my experience was fantastic if not all too brief as the realities of life as a politician became clear. Throughout the rest of the day we were entertained by Q & A sessions with Professor Ian Chubb, former Chief Scientist as he reflected on his experiences in this position and then Senator Kim Carr, Shadow Minister for Higher Education, Research, Innovation and Industry. Senator Carr put into words how I believe a lot of people were feeling that CSIRO is not a glorified consultancy and if we keep going that direction we will undermine its status as our nations research centre completely.

The new Chief Scientist Dr Alan Finkel gave his first address at the National Press Club which I unfortunately missed as my meeting clashed with this event but I did get to attend the reality show also known as Question Time for the House of Representatives.

The day ended with a panel of politicians all passionate about science chaired by Genevieve Jacobs from ABC Canberra with Professor Aidan Byrne, ARC, the Hon Karen Andrews, Assistant Minister for Science, the Hon Richard Marles, Shadow Minister for Immigration and Border Protection and Dr Adam Bandt, Industry, Energy, Science and Research spokesman.

Overall, the take home message from Science meets Parliament 2016 was Professor Graham Durant’s comment “science isn’t finished until it’s communicated” which is something we should all remember and include as an important part of our research.