Phytogen June 2021

Your National Science Week event, June Phytogen and GPC e-bulletin

16 June 2021

Dear ASPS Members,

June Phytogen can be accessed HERE.

GPC May e-bulletin can be accessed HERE.

Our Society is organising activities during Science Week (14-22 August) to highlight Australian plant science. The theme of our activities is around "Plant Science Safeguarding our Future Food Security". A series of short, fun and engaging talks and tours will be organised around the country to explain the pivotal role plant scientists and agriculturists play in feeding and clothing us all. We will present some of our research and explain how it will help meet the challenges posed by a growing world population and a changing climate. We'll emphasise the diversity of plant science. The fact that some of us wear lab coats and rarely grow a plant in soil, while others conduct field trials or predict yields by satellite. The aim of these sessions is to explain what we do, to highlight its importance to society and hopefully to inspire more young people to consider plant science as an exciting career.

The purpose of this email is two-fold:

1. to prompt members from universities not listed below to consider organising an event. Contact me for details if you're tempted.
2. to encourage ASPS members to contact the Science Week coordinators at their own university (below) and offer your assistance. Helpers and speakers do not need to be ASPS members.

Contact me if you have questions. Thanks, Peter Ryan

Once you have your National Science Week event organised please email Phytogen editor Georgia Koerber (georgia.koerber@adelaide.edu.au) with a link to your event, a picture and dates for inclusion in the July issue of Phytogen. June Phytogen can be accessed HERE.

Queensland University of Technology – Brett Williams

University of Newcastle – Joseph Pegler (hopefully)

University of Sydney (separate events at the Camperdown and Camden campuses) – Mary Byrne, Brent Kaiser, Robert Park, Marcus Heisler, Claudia Keitel

Australian National University/CSIRO Agriculture and Food – Peter Ryan, Caitlin Byrt, Uli Mathesius

La Trobe University – Kim Johnson, Janet Wheeler

University of Melbourne – Mike Haydon, Michelle Watt

Monash University – Ros Gleadow

University of Adelaide – Megan Sheldon, Beth Loveys, Georgia Koerber, Steve Tyerman, Rachel Burton

Flinders University – Kathy Soole

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June 2021 Phytogen

15 June 2021

Welcome to Phytogen for June 2021. Plans are well underway for a **National ASPS Hybrid meeting on Thursday and Friday 25th and 26th November 2021. More details soon.** Meanwhile, in this issue:

- Report from 2020 Jan Anderson Award joint recipient, Dr Kristine Crous, Western Sydney University.
- National ScienceWeek 2021 – 14th-22nd August





- Events

In 2020, we had joint recipients for the Jan Anderson Award. I hope you will enjoy reading about the wonderful work by Kristine Crous from Western Sydney University.

2020 Jan Anderson Award joint recipient – Dr. Kristine Crous, Western Sydney University.



Fig.1: Kristine in tropical rainforest in Australia.

Globally, the average temperature has increased by about 1°C since the Industrial revolution, and Australia has experienced a sustained period of warmer climate over the past 10 years including several of the hottest summers on record. While Australia is one of the drier continents in the world, there is also a lot of biodiversity with a unique set of plant and animal species. We all depend on plant species and their ecosystem services in several ways (i.e. food, clean air, ecotourism) but it is still unclear to what extent these services will change in a future warmer world. Understanding how plant function adjusts to these warmer conditions, in part

caused by commensurate increases in atmospheric CO2 has been the focus of my research effort.

The Jan Anderson Award recognised the contributions that I made to understand plant responses to both elevated CO2 and climate warming, insights that contributed to several global datasets (Atkin et al., 2015; Kumarathunge et al., 2019; Smith et al., 2019) and to improve climate feedbacks represented in models (De Kauwe et al., 2013; Jiang et al., 2020).

I have conducted several experiments on Eucalyptus species to understand their physiological responses of photosynthesis (Crous et al. 2013) and respiration to climate warming (Crous et al. 2011, 2017). In an experiment using temperate and tropical provenances of two broadly distributed Eucalyptus species, I discovered that photosynthesis operates closer to the temperature optimum in tropical provenances than temperate provenances (Crous et al. 2018).

Given that there are large uncertainty regarding the temperature responses of rainforest species, I have measured the temperature response curves of photosynthesis and respiration in tropical and temperate rainforests to understand how close they are operating to their thermal optimum and how vulnerable these species are to further climate warming, as part of a DECRA award (Fig. 1).

Not only are Australian rainforests biodiverse, they have a direct link to the past, as many rainforest species have a Gondwanan lineage. So while these rainforests have seen some climate change in the past, the question is how will they cope with future climate warming?

To explore future climate conditions, my work has involved experimental set-ups such as the whole-tree chamber experiment (Fig. 2) or the Eucalyptus free-air CO2 enrichment experiments (EucFACE) (Fig. 3, 4), where elevated atmospheric CO2 or atmospheric warming treatments can be applied on large trees. Because trees have long lifespans, their ability to acclimate will likely be an important factor in determining their future.





Fig. 2: The whole-tree chamber experiment at Western Sydney University in Richmond after completing diurnal measurements (left) and measurements on saplings outside the chambers (right).





Fig. 3. Getting ready to do measurements in the Eucalyptus canopy at the EucFACE experiment at Western Sydney University (above) and measuring photosynthesis (right).



Fig. 4. EucFACE, two out of the six plots, view from above.

These large-scale experiments enable many collaborations examining different parts of an ecosystem in an attempt to understand the bigger picture including feedbacks of nutrients on the carbon cycle. While we are developing some understanding on how plants adjust to warmer temperatures, there are still many questions that are unclear, especially around temperature limits and plasticity among different plant species. Most models currently do no account for thermal acclimation of respiration and/or photosynthesis, with the risk of overestimating future responses of carbon uptake.

Recently, I have been elected as a ASPS representative for NSW in the discipline of whole plants. I hope that we can continue to link plant responses from molecular to ecosystem scales back to the whole plant and what it means for its survival, function and growth. Changes in response to biotic and abiotic factors in a plant's environment drive natural selection which is part of how plants adapt to new conditions.

References

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National Science Week 2021

Many events (August 14th-22nd 2021) are happening nationally and the ASPS is part of the action.



The theme for all the events we are organising is: “Plant Science Safeguarding Our Future Food Security: By the middle of the century there will be almost 10 billion people on Earth – an awful lot of mouths to feed, especially when a warming climate makes agriculture more challenging. Scientists may save the day by helping crop species adapt and thrive as growing conditions change.

The Australian Society of Plant Scientists is organising visits to laboratories and field sites across the country. Through talks, displays and demonstrations they give rare insight into the challenges faced by farmers, and how food scientists are working to help.”



In coming weeks, look out for events posted to the "Find an Event" page on the National Science Week webpage, and also posted to ASPS's twitter account (@asps_ozplants), which hopefully you are all following. Please be part of the action and post your events too.

July Phytogen will aim to provide a list of the ASPS events happening during August 2021.

Events



details soon.....


Save the Date!
PB21
PLANT BIOLOGY
Worldwide Summit
July 19–23
From
a global audience
To
a global audience
33
10
54
49


ComBio
2022
MELBOURNE
Melbourne Convention and Exhibition Centre
27 September - 30 September 2022


13th International Congress on
Plant Molecular Biology
Cairns, Queensland, Australia
Sunday 23 to Thursday 27 October 2022



Please login and check your ASPS membership is up to date. Encourage your colleagues and students to join ASPS.

Tweet to @asps_ozplants your news and upcoming events.