



Newsletter

Australasian Systematic Botany Society

No. 188, September 2021



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From the President

Mike Bayly

I started my last report with comments on the COVID situation in Australia and how a level of normality was starting to return for some of us. How premature that was!! With optimism I mentioned my upcoming plans for interstate fieldwork. And, although Dan Murphy and I did finally make it to the Northern Territory, it was only after previous attempts on June 1 and June 22 (both cancelled because of Melbourne lockdown), June 27 (cancelled because of Darwin lockdown that afternoon) and June 30 (cancelled because of Alice Springs lockdown while we were in mid-air!), before successfully arriving on 6 July. After 12 rushed but glorious days of eucalypt collecting, we subsequently flew home to Melbourne again in lockdown. My thoughts are with all members who are struggling through these times, especially those currently caught in the lockdowns in New South Wales, Victoria, the Australian Capital Territory and New Zealand, and our newest members in Papua New Guinea.

A successful conference

As reported elsewhere in this *ASBS Newsletter*, the recent conference was a great success! On behalf of the society, I'd like to thank all members of the organising committee for doing such a fantastic job, especially Katharina Nagar, Frank Zich, Darren Crayn, John Clarkson and Ashley Field. Apart from the great scientific program, including a wonderful series of keynote talks, the key impression I got (from what I saw and from conversations with others) was a fantastic sense of community. This is due both to careful planning by the committee to foster interaction in a challenging online environment, and because our ASBS family came to the party with its usual welcoming spirit. On top of that, thanks in large part

to the fundraising efforts of Darren Crayn, the conference will also return a profit to the society!

After looking forward to the conference for months, my changed field plans meant that I was on the road during much of the conference and could only drop in for some sessions. I'm sorry that I wasn't there for more of it and am grateful to the rest of ASBS Council for covering my back and, indeed, encouraging me to go bush while I still had a narrow window of opportunity. I will now look forward, when the conference videos are online, to catching up on talks that I missed.

In the beginning

In the lead up to our 50th Anniversary, I've been enjoying information about early ASBS history that Alex George and John Clarkson have been compiling, another instalment of which is presented in this *ASBS Newsletter* issue. I'm looking forward to seeing more, and for the opportunity this anniversary will give us to look back at where we have come from and to think about where should go from here.

AGM

As previously notified, the next Annual General Meeting of the society will be on Tuesday October 5, 2021 at 1 pm Sydney time. It will be run wholly online and the video conference details will be sent to all members closer to the time. We'd love to see a good turnout of members, so it would be great if you could flag this time in your calendars.

From the editors

Lizzy Joyce

Alex retires as Associate Editor

It is with a heavy heart that we say goodbye to Alex George from the editorial team. Alex has been *ASBS Newsletter* Associate Editor for the past 18 months, and was a major source of encouragement, advice and help for me when I decided to take on the Editor role. He's been invaluable in collating articles each issue, checking content carefully for grammar and formatting and providing irreplaceable historical context to help shape the *Newsletter* into its current form. He'll be sorely missed, but we hope stepping back from this role will give him more time to focus on his numerous other projects in botany and history. It also means we're one short on our Editorial team – if you'd like to join the team please get in touch with me at editor.asbsnews@gmail.com – we'd really love some extra help!

Apology

In our last issue (no. 187 June 2021) *ASBS Newsletter* published an article entitled "'Chinese' Wilson, Kewites and Australia". This article included a direct transcript of *The Journal of the Kew Guild* that illustrated the influence of Kew on Australian botany, but included some sexist and racist language that reflects the attitudes of the time it was written. In the original version of *ASBS Newsletter* emailed to members, the article was published without any warning, and may have caused distress to some readers. Upon realising our mistake, we made every effort to rectify it by affixing a sticker warning to printed copies of *ASBS Newsletter* before they were posted, and by amending the online version to also include a warning. I sincerely apologise to *ASBS* members for my oversight and especially to anyone for whom this language caused offence or distress. Although such texts can hold value in

providing a historical record, we recognise that reproduction of these texts in modern publications such as *ASBS Newsletter* requires more sensitivity and judiciousness to avoid causing alienation, disrespect or distress to our members, and to make explicit that these views are unacceptable. As such, going forward the *ASBS Newsletter* Editorial team will handle sensitive material according to these steps:

1. Upon the identification of sensitive language, we will first consider the need to publish or reproduce that language. We will consider redacting sensitive parts of the text, or not publishing the article altogether.
2. If, on balance, there is a need to include sensitive language in an article, the Editors will preface the article with a warning to make it clear that the attitudes do not reflect the attitudes of the society, and to warn any readers that might wish to avoid reading such language. For example:

"WARNING Some material in the following article, which is reproduced verbatim from XXX, is culturally offensive, including racist and sexist remarks that could be distressing for some readers. These views, reflecting the attitudes of the original author, are not those of ASBS Council or the Newsletter editors."

We welcome any feedback from *ASBS* members on this approach to handling sensitive material in *ASBS Newsletter* in the future at editor.asbsnews@gmail.com.

New ECR and student feature

In an effort to enhance the visibility and connectivity of our early career researchers (ECRs) and students, we have started two regular sections focussing on this cohort of

our membership. Firstly, we have a new 'ECR Feature' section where we profile the work and interests of our ECRs and students. This issue we get to know Francis Nge, who has just had his doctorate conferred and was the winner of the Pauline Ladiges presentation prize at ASBS2021. Secondly, we have introduced an 'ECR and student register' that will feature at the back of every issue. Here you can find the details of all ASBS students and ECRs should you want to advertise a postdoc position or PhD project, casual work or pub crawl (remember those pre-COVID things!?). If you're a student or ECR and would like to

opt-in to this register, fill in the form here: <https://forms.gle/D2LBZemM8Q5tJRZ66>.

Finally, I'd like to thank everyone that has contributed to this bumper issue of *ASBS Newsletter*; it's great to see the involvement, opinions, activities and achievements of our membership! As always, if you have anything to contribute, get in touch with me at editor.asbsnews@gmail.com.

ASBS website - help needed!

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In "other business" raised at the 17th Annual General Meeting of the-then Australian Systematic Botany Society in September 1998, Jim Croft reported that he had created "a World Wide Web homepage for ASBS" [Web ref. 1]. The WWW was helpfully explained in an issue of the Newsletter earlier the same year as being "the 'information superhighway' that has been receiving so much hype in the media lately". Members were cautioned that they might find using the Web slow "because with all the publicity, the rate of usage is going up exponentially, and slowing the whole thing down". [Web ref. 2]. Interestingly no URL for the new site was included in the report, but there is no doubt that it was hosted by the Integrated Biodiversity Information System (IBIS) team based at the Australian National Botanic Gardens in Canberra. This arrangement has continued to the present day, with webmasters by necessity always being associated with the same institution (including Andrew Lyne, Murray Fagg, and Anna Monro).

This is all about to change, with Council recently resolving that the Society should arrange web hosting independent of any particular institution and also undertake a rethink and redesign of the site for the 21st century. (Seems like this "WWW" thing has caught on at last.) This should have a number of advantages for us, including a mobile-friendly design, the ability for multiple people to edit portions of the content, and the possibility of various future improvements that could not be offered on a government-hosted site (e.g. the ability to accept annual subscriptions and other payments online).

We have both agreed to coordinate this project to "shepherd" the site from its current location to a new hosting arrangement. Meanwhile, behind the scenes we will begin to develop our new-look website in parallel, so that it can be seamlessly launched once complete, ensuring we are not offline for an extended period. We have already begun reviewing and updating the current content

but can't do this alone! If you have skills in modern web design and content creation or experience with contracting web hosting arrangements we'd love to hear from you. We'd also like to solicit the general membership for input, including thoughts on what you'd like to see on the site. Finally, we are seeking a keen volunteer to help source and coordinate the submission of images. These would be featured on the site (with credit given) to highlight "plants, people and places", showcasing the diversity of the work ASBS members are doing on our remarkable Australasian flora.

Web ref. 1: <http://www.asbs.org.au/news-letter/pdf/95-dec-085.pdf#page=28> [ASBS Newsletter 85: 26 (December 1995)], accessed 24 May 2021.

Web ref. 2: <http://www.asbs.org.au/news-letter/pdf/95-jun-083.pdf#page=3> [ASBS Newsletter 83: 1 (June 1995)], accessed 24 May 2021.

Newsletter archive

Kelly Shepherd ASBS Councillor

The first ASBS newsletter was published in 1974. Selwyn L. Everist, then Director of Queensland Herbarium who authored the very first article, hoped the newsletter would be a "medium for the exchange of ideas and for comment on what is going on in the field of systematic botany in Australia". He warned that the success of the newsletter was in the hands of the membership and hoped it would not follow the fate of the Australian Herbarium News, which "flourished for a time then perished in the desert sands of apathy". Thankfully due to ongoing engagement we are still going strong! You can access Selwyn's gem and any of the last 47 years' worth of articles through our ASBS website (<http://www.asbs.org.au/newsletter.html>), which includes pdf versions or HTML content (1989 – 2020) of all back issues. As a backup, we recently decided to also approach Biodiversity Heritage Library Australia to digitally archive the newsletter, so back issues are now also available through BHL (<https://www.biodiversitylibrary.org/bibliography/180547>).



Above Cover of the first ASBS Newsletter, published in March 1974 and now available online through the ASBS website and BHL

Genomics for Australian Plants update

Lalita Simpson GAP Research Community Project Manager, Australian Tropical Herbarium and James Cook University

Mabel Lum GAP Project Manager, Bioplatforms Australia

Darren Crayn GAP Phylogenomics Lead, Australian Tropical Herbarium and James Cook University



www.genomicsforaustralianplants.com



[@PlantsAus](https://twitter.com/PlantsAus)

The GAP Initiative is developing genomic resources and expertise to enhance our understanding of the evolution of Australia's unique flora and support its management. GAP was initiated by [Bioplatforms Australia](#) in partnership with the Australian state and national herbaria and botanic gardens. GAP has three project streams: [reference genomes](#), [phylogenomics](#), and [conservation genomics](#). Here, we present an update on progress in each of these streams since June 2021.

Stage 1 of the project has been undertaken in partnership with the [Plant and Fungal Tree of Life project](#) (PAFTOL) that is working towards reconstructing a genus-level phylogeny of the world's angiosperms using the Angiosperms353 kit. Sequence data have been generated for 1,468 samples sampled by Australian researchers, with an additional 554 samples received from the PAFTOL project, and processing of the raw reads into gene sequences is complete. We have begun to consider how best to proceed from data to publications and other outputs from Stage 1 and will soon invite all AAToL project participants to a consultation and planning workshop. Meanwhile, AAToL Stage 2 has begun, which aims to fill the tips of the Australian Angiosperm Tree of Life through the production of datasets with denser sampling within genera to address questions of monophyly, evolution, and biogeography. Confirmed Stage 2 projects include Alismatales, tribe Boronieae (Rutaceae), *Drosera*, Ericaceae, *Hibbertia*, tribe Lasiopetaleae (Malvaceae), tribe Mirbelieae (Fabaceae), tribe Chamelaucieae (Myrtaceae), *Persoonia*, Santalaceae, Styliaceae, *Tecticornia* & *Salicornia*, *Teucrium*, *Typhonium* and *Xanthorrhoea*.

Reference genomes

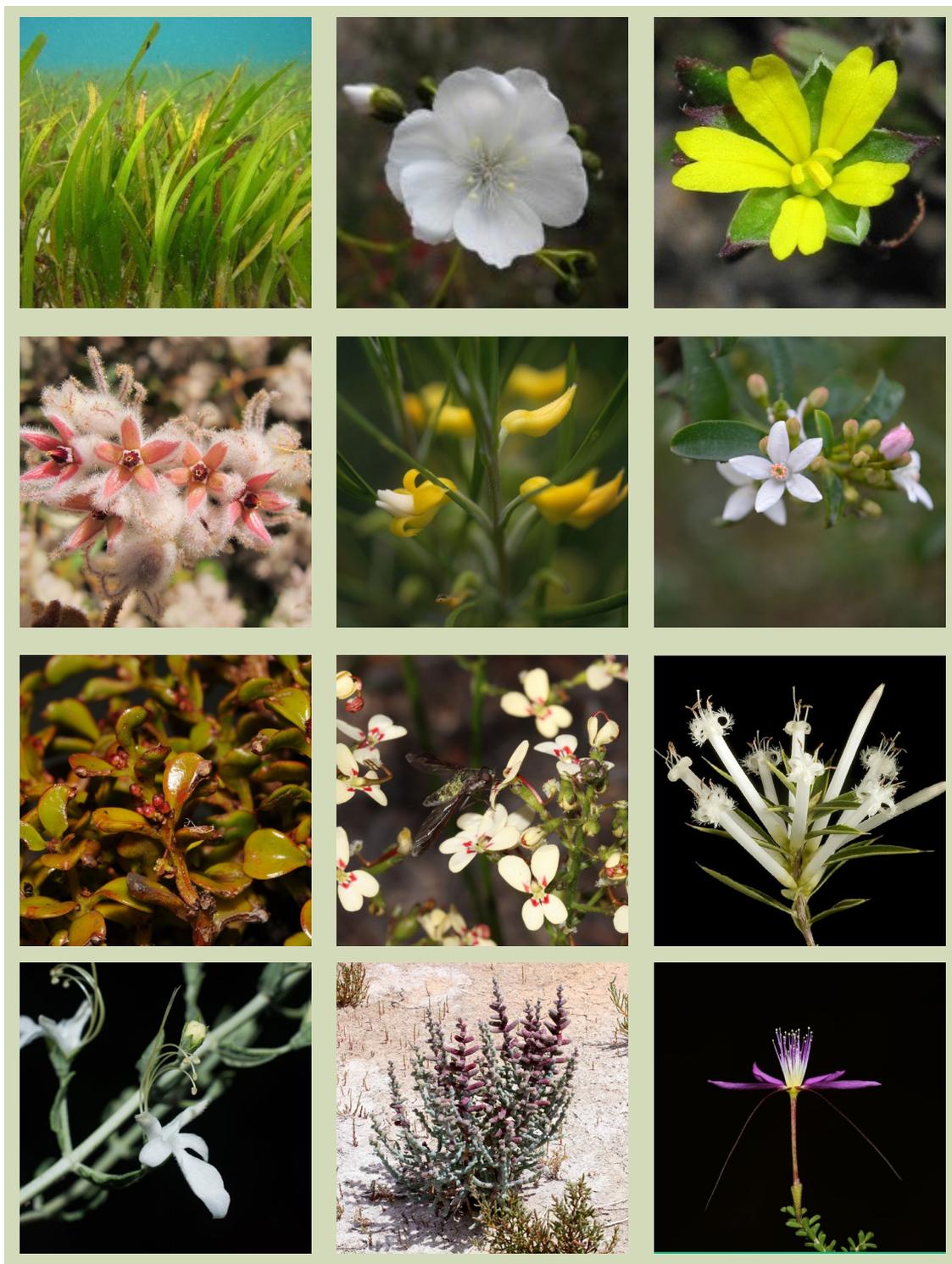
The reference genome stream aims to sequence and assemble the genomes of representative Australian plant taxa. The first of the pilot reference genomes to be released, the *Telopea speciosissima* (waratah) genome by Stephanie Chen and colleagues from the University of NSW and the Royal Botanic Gardens and Domain Trust, is now out on [bioRxiv](#). Sample preparation, sequencing and data analysis for the remaining species in the second phase are ongoing and the third phase is now underway with two more genomes to be generated: *Hibbertia scandens* and *Tasmania lanceolata*.

Phylogenomics (Australian Angiosperm Tree of Life (AAToL))

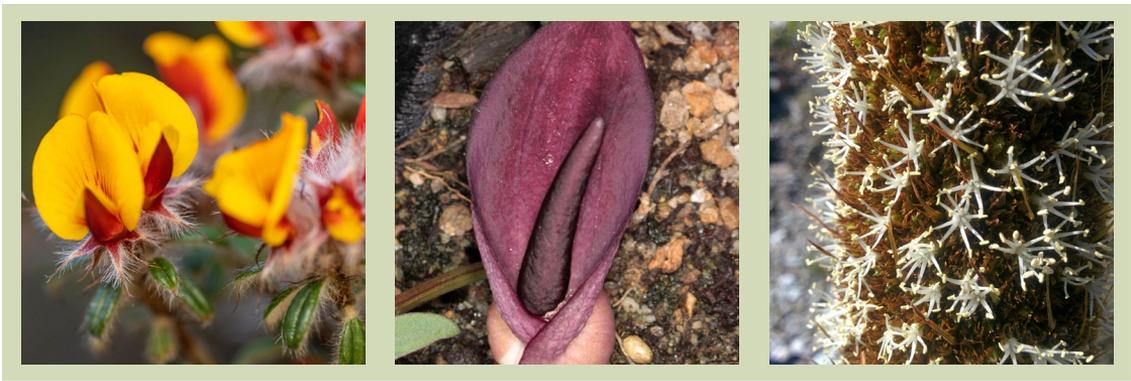
In Stage 1, the GAP phylogenomics project aims to reconstruct a genus-level Australian Angiosperm Tree of Life (AAToL), by sequencing more than 95% of the nearly 2,100 native Australian angiosperm genera for 353 low copy nuclear genes using the [Angiosperms353 target capture nuclear bait kit](#).

Conservation Genomics

The Conservation genomics stream aims to provide genomic information to support conservation of the Australian flora and focuses on the resolution of species complexes consisting of suspected conservation dependent species. Conservation genomics



Left to Right Alismatales; *Drosera* sp.; *Hibbertia* sp.; *Lasiopetalum* sp., photo by Kelly Shepherd; *Per-soonia stricta*, photo by Peter Weston; *Philothea myoporoides* subsp. *myoporoides* (tribe Boronieae, Rutaceae), photo by Harvey Orel; *Cladomyza cuneata*, photo by Shelley James; *Stylidium amphora*, photo by Juliet Wege; *Styphelia tenuiflora*, photo by Kevin Thiele; *Teucrium racemosum*; *Tecticornia verrucosa*, photo by Kelly Shepherd; Tribe Chameaulaucieae (Myrtaceae).



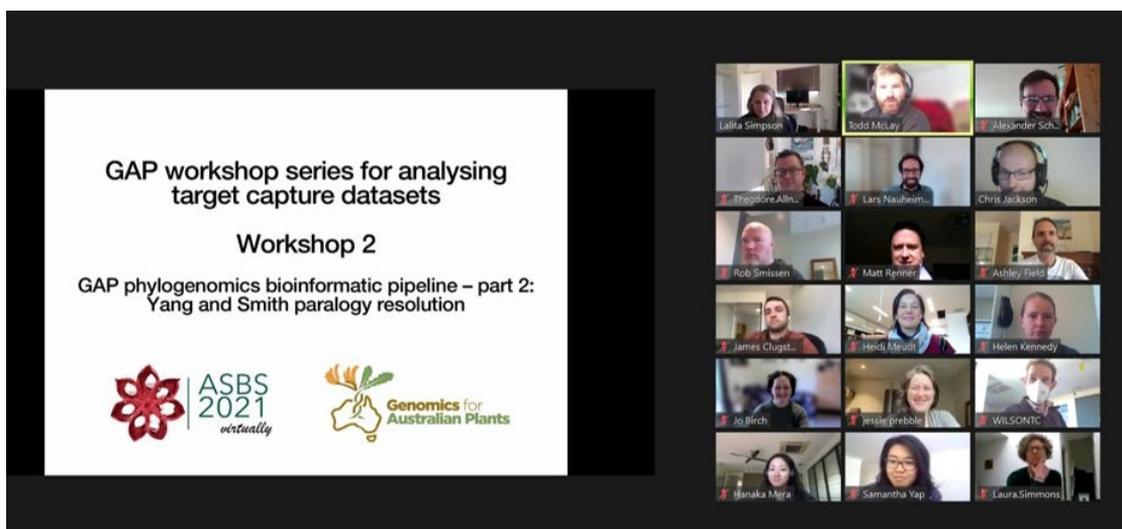
Left to right Tribe Mirbelieae (Fabaceae), photo by James Clugston; *Typhonium* sp., photo by Matt Barrett; *Xanthorrhoea glauca*, photo by Todd McLay.

projects were initiated in 2020 utilising the genotyping by sequencing (GBS) approach selected for its ability to distinguish genetic variants among closely related individuals, for example within species complexes. Data generation is now complete for six projects: [Geleznovia verrucosa](#), [Wurmbea dioica subsp. alba complex](#), [Synaphea stenoloba](#), [Isopogon buxifolius](#), [Cassia species](#) and [Zieria species](#).

GAP at the ASBS conference

The virtual ASBS conference was a fantastic opportunity to get together and present some early findings coming out of the GAP

initiative and a big thanks go out to the conference organising team and all the speakers. In the lead up to the conference and the week following, the GAP bioinformatics working group presented a virtual webinar and workshop series on the bioinformatic analysis of target sequence capture data including two webinars and three practical bioinformatics workshops. A huge thanks go out to all the workshop facilitators, Chris Jackson, Theo Allnutt, Todd McLay (each from Royal Botanic Gardens Victoria), Lars Nauheimer (Australian Tropical Herbarium) and Alexander Schmidt-Lebuhn (CSIRO, Centre for Australian National Biodiversity



Above Screenshot of the GAP workshop held online at ASBS2021

Research & National Research Collections Australia) and all the workshop participants. During the virtual ASBS conference, we enjoyed 5 days of botanical presentations including a GAP themed symposium. Presentations from GAP researchers included Darren Crayn (Australian Tropical Herbarium) presenting an overview of GAP Phylogenomics, Bill Baker (Kew) presenting on the Plant and Fungal Tree of Life Project, Benjamin Anderson (Department of Biodiversity, Conservation and Attractions, Western Australia) on using genomic data to help resolve difficult taxonomic complexes of conservation importance in Western Australia, Alexander Schmidt-Lebuhn presenting a genus-level phylogeny of Australian Asteraceae and Laura Simmons (Royal Botanic Gardens Victoria and Queensland Herbarium) on the resolution

of species complexes.

Acknowledgements

We would like to acknowledge the contribution of the Genomics for Australian Plants Framework Initiative consortium (<https://www.genomicsforaustralianplants.com/consortium/>). The Initiative is supported by funding from [Bioplatforms Australia](#) (enabled by [NCRIS](#)), the [Ian Potter Foundation](#), [Royal Botanic Gardens Victoria](#), [Royal Botanic Gardens Foundation \(Victoria\)](#), [Royal Botanic Gardens Sydney](#), [Department of Biodiversity, Conservation and Attractions, Western Australia](#), [CSIRO](#), [Centre for Australian National Biodiversity Research and Council Heads of Australasian Herbaria](#).

ABRS Report

ABRS team abrs@environment.gov.au

Flora of Australia (FoA)

Recent Flora treatments include *Bertya* (Euphorbiaceae), Centrolepidaceae, *Desmocladius*, *Eurychorda* & *Sporadanthus* (Restionaceae), Linaceae, Macarthuriaceae, Molluginaceae, *Polygala* & *Xanthophyllum* (Polygalaceae), *Saponaria* (Caryophyllaceae), and revised editions of Annonaceae, *Colocasia* (Araceae), Opiliaceae and numerous miscellaneous taxa. Taxa from the Oceanic Islands *Flora of Australia* Volumes 49 & 50 continue to be added to the eFlora as new profiles or incorporated into existing treatments, e.g., the Lord Howe Island endemic daisies and palms. Many thanks to all our Flora contributors, especially recent contributions from Barbara Briggs and Ian Telford.

Flora contributions

Please contact the ABRS (email address above) with any feedback on *Flora of Australia* and *Bryophytes of Australia* content or platform functionality. If you would like to contribute new taxon profiles or update existing descriptions, please get in touch. This could include anything from adding complete treatments to adding profiles for taxa from your research papers. There is also much opportunity for updating and editing treatments loaded from the hard copy floras, including reconciling information with currently accepted taxonomic concepts and updating keys.

ASBS July 2021 conference

Endymion presented a talk titled *Succeeding with the National Taxonomy Research Grant Program*. Please contact ABRS if you have any queries about ABRS grant applications or project reporting and assessment. And we always appreciate receiving the outputs from the grant funded projects.

Congratulations to everyone who presented or exhibited their research findings at the conference, and to the organisers and convenors for their tremendous efforts to deliver a successful conference under difficult circumstances. It was also great hearing the results of projects partly funded by ABRS grants and

catching up with colleagues and friends.

Staffing

Key contacts:

Zoe Knapp, ABRS Manager (acting)

Endymion Cooper, Bryophytes of Australia treatments and Flora platform issues

Phillip Kodela, Flora of Australia treatments

Bush Blitz news

Bush Blitz completed a successful expedition on the Groote Eylandt Indigenous Protected Area in June with the NT Museum and NT Herbarium as the lead institutions. The expedition involved five NT teachers, ten indigenous rangers and numerous traditional owners. Two community events were also held in the local indigenous communities during the expedition.

Bush Blitz partnered with Museums Victoria and CSIRO for the Discovering the Indian Ocean Territories voyage, on board the *Investigator* research vessel in June and July. Bush Blitz developed a virtual schools program that included a series of live chats with on board researchers. Unfortunately, the voyage was shortened by CSIRO as a precautionary measure to undertake a review of some of the ship's high-pressure compression equipment and a second phase of the voyage will be rescheduled. Further information can be found at https://mnf.csiro.au/en/Voyages/IN2021_V04

The next Bush Blitz will be held from 22 Nov – 3 Dec in SW South Australia on the Yalata IPA and nearby conservation reserves. The expedition will include both terrestrial and marine collections.

Grants

The 2021–22 National Taxonomy Research Grant Program (NTRGP) round closed on 18 December 2020. Successful grants are published on the Grant Connect website (www.grants.gov.au) and will soon be published online at: www.environment.gov.au/science/abrs/grants/awarded.



ASBS2021 Conference Report

Harvey Orel

This year marked a watershed moment in the history of *Australasian Systematic Botany Society* conferences - for the first time it went virtual! Originally slated to be held as a face-to-face meeting in Cairns with the theme 'Biodiverse futures - Systematics in a Changing World' (conceived in 2019), the conference organising committee seems to have had an unworldly premonition of global events. Luckily, the more than 200 delegates attending this year's conference were in safe hands and, with commander-in-chief Katharina Nargar at the helm of the mothership, the conference took off via the Babl virtual platform on 12 July.

For some, however, the conference started early; two bioinformatics workshops on the analysis of target-capture sequence data had been held the week before. The first workshop, judiciously put together and led by Chris Jackson, focussed on assembling target-capture reads with HybPiper and featured the new HybPiper-RBGV pipeline. The second workshop tidily built on this, focusing on paralogy resolution using the Yang and Smith pipeline, and was well-led by Alexander Schmidt-Lebuhn and his cat, Pixel. These workshops, including a third on HybPhaser held after the conference and led by Lars Nauheimer, were a fantastic way to familiarise oneself with the (sometimes tricky) cutting edge software that thorough analysis of target-capture data relies upon. Workshop organisers Lalita Simpson, Todd McLay, Lars Nauheimer, Theo Allnut, Chris Jackson and Alexander Schmidt-Lebuhn did an impressive

job compiling a suite of training materials that will endure beyond the conference, and in setting up in a manner that allowed attendees to participate remotely.

On the Sunday eve of the conference, a pre-conference mixer was held in the virtual networking space that was to become our online home for the rest of the week. The next morning began with the opening of the conference and a welcome to country by Katharina Nargar (Figure 1), followed by a keynote talk from Linda Broadhurst on *Biological collections as 21st century research infrastructure*. Linda's talk was an important reminder of the value of our collections, and the wide range of applications that collections can have. This led into the first session of talks on the same topic beginning with Gill Brown, who told the story of BRI's massive uptick in the digitisation of herbarium specimens, and Michelle Waycott (disguised as Andrew Thornhill), who detailed an approach to the cataloguing of AD's bryophytes that



Figure 1 Katharina opening on Day 1 of the conference with the infamous ASBS pig

included optical character recognition software and crowdsourcing online volunteers to database large numbers of specimens in short time frames. Talks followed from Craig Edwards and Nigel Fechner on the creation of a lucid key for *Melaleuca* and knowledge gaps in biodiversity, respectively, before the session was wrapped up by Endymion Cooper, who outlined the keys to success for ABRIS grant applications.

Session 2 focussed on trait evolution in Australian plants and began with a description of the *AusTraits* project by Hervé Sauquet; the aim of this ambitious project is to collate functional and structural trait data from across the Australian flora. This was followed by two student talks from Yasmin Asar and Ruby Stephens, who both presented impressive amounts of work from their first years of research. Yasmin provided insight into her work on methods for detecting correlated rates of morphological and sequence evolution and showed that she was unable to find such a correlation using an empirical dataset. Ruby's talk highlighted the wonderful potential of the *AusTraits* project by using floral trait data from that project along with species occurrence data to make inferences on the relationship between flowering periods and climate across Australia. Greg Jordan finished off the session with a talk on the potential pitfalls of ancestral state reconstruction, focussing particularly on issues to do with characters under selection. He also raised the serious question of what the hypothetical ancestor of an egg and a tomato

would look like, but to my disappointment did not provide an answer.

The next session kicked off with a shot of vitamin C from back-to-back talks on Rutaceae systematics by Marco Duretto and myself. James Clugston introduced a plan to use target-sequence capture data to resolve relationships in the large pea tribe Mirbelieae with the aims of providing a new classification, and Stephanie Goedderz presented her research into the phylogeny and degradation of plastid genes in the eye-catching, mycoheterotrophic *Dipodium* orchids. This rounded off the first day of 15-minute talks, which had all run very smoothly and eased the users of the conference platform into its mechanics; by this point it was clear that infinity screens would be an additional, unintended theme of the week.

After these talks time was allocated for the virtual poster session, for which the online format provided new ways of creatively presenting "posters". A stand-out for me (albeit rather shocking and depressing) was a 60 second video that animated the impacts of the 2019-2020 Black Summer bushfires on south-eastern Australian plant species by Nunzio Knerr, David Albrecht and Robert Godfree. Following the poster session, Alexandre Antonelli presented a keynote talk on *Unleashing the power of systematic botany to tackle society's biggest challenges*.

Tuesday began with the customary greeting/welcome from Katharina, and the belated presentation of the 2020 Nancy T. Burbidge medal to Wendy Nelson. It was fantastic to see Wendy joined in-person by her colleagues across the ditch, and to have Heidi Meudt present her with the medal (Figure 2). This touch of human-human contact injected a sense of community into the conference proceedings and, following Wendy's keynote talk on the various approaches to recognizing non-indigenous marine macroalgae in New Zealand, the 15-minute talks began with a feeling of togetherness. The theme for sessions 4 and 5, *Elucidating cryptic diversity*, saw talks from So Young Jeong, Christine



Figure 2 Heidi (far right) presenting the Nancy Burbidge medal to the 2020 recipient Wendy Nelson (second from left) in New Zealand

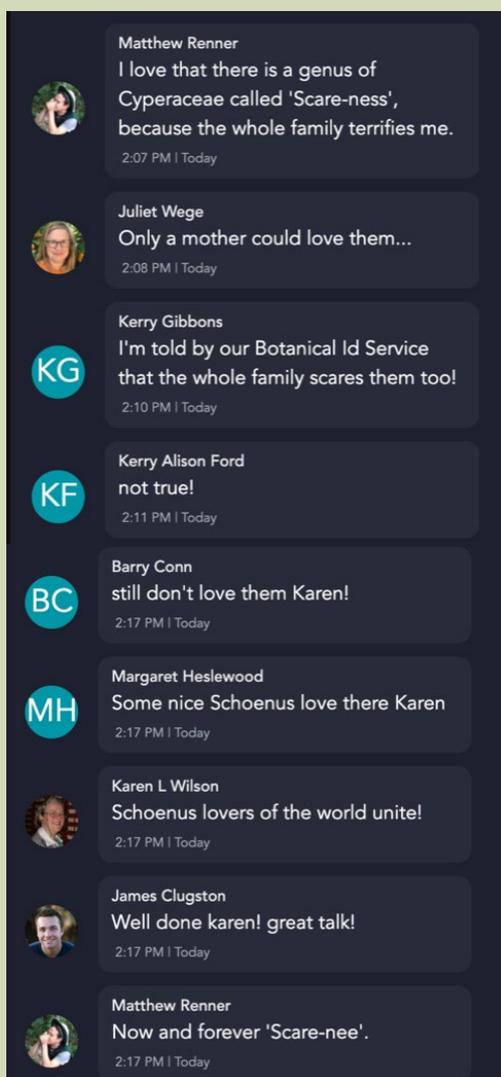


Figure 3 An excerpt of the lively chat ongoing throughout the conference from Karen Wilson's talk "Advances in *Schoenus* phylogenetics and taxonomy at the boundaries of evolution"

Cargill, Gibson Sosanika, Cecile Guéidan, Matthew Barrett and Tom May. Student talks followed from Zoe Bloesch, who demonstrated how HybPhaser can unravel complex reticulate evolutionary relationships into refined, clear stories in Thelypterid ferns, and Matthew Adeleye, whose talk *Region-specific Myrtaceae pollen morphology study is effective in separating fossil Myrtaceae pollen types* won the Bob Anderson Award.

Session 6 capped off the day's talks in a

"Cyperaceae Symposium", with talks from Karen Wilson, Russell Barrett, Jeremy Bruhl and Isabel Larridon covering everything from species, generic and tribal-level classification to big-picture pondering on the next steps of Cyperaceae research. Some innocent teasing in the chat throughout the session kept the mood light throughout (Figure 3). Finally, a meeting at the end of the day kept ASBS members up to date with the activities of council, and featured John Clarkson's treasurers update from the back seat of his ute. The amount of love shown for John in the chat (Figure 4) suggested that it might not be unfathomable that the Australasian Systematic Botany Society one day becomes the "John Clarkson Appreciation Society".

Wednesday began with anticipation, with the focus of the day being on systematic botany in Papua New Guinea. The online format of the conference presented the fantastic op-

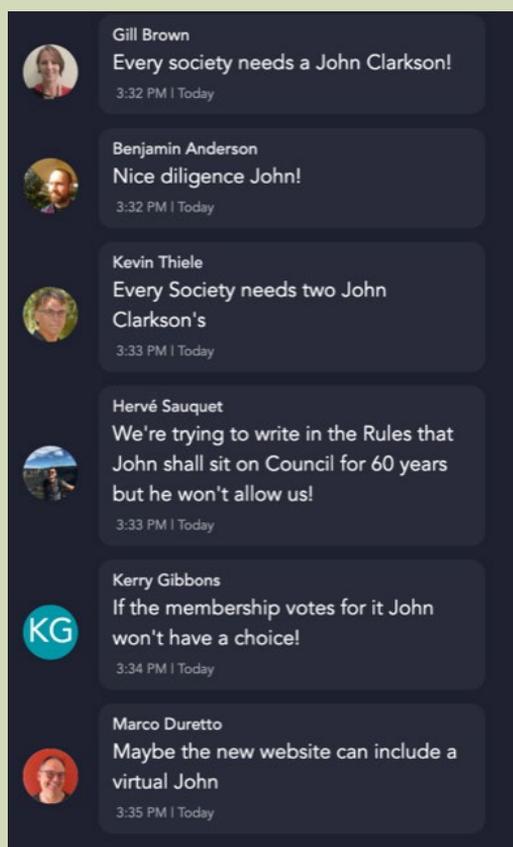


Figure 4 ASBS members loving the Treasurer's Report by John Clarkson in the chat

portunity of hearing talks from a number of botanists from PNG. The opening keynote talk by Kipiro Damas provided listeners with an overview of the history of systematic botany in PNG, the current state of systematic research and outlined key areas for improving the status and activity of systematic botany in the country. Despite dealing with a raft of technical challenges the speakers did well to overcome these, sometimes even speaking to slides controlled remotely from another computer. The topics of talks ranged from taxonomy, such as that of Penniel Lamei who presented his plans for a revision of the striking genus *Saurauia*, to Michael Lovave's talk on the collaborative work being done to restore and improve the Lae National Botanic Gardens. Overall, the interaction with our PNG counterparts proved an incredible opportunity for knowledge sharing and provided the sense of a start of a bright future of collaboration and long-awaited connection with researchers from one of Australasia's most botanically diverse regions. The last session of talks for the day moved away from the PNG focus to studies of a more biogeographical nature. This included talks from Mark Chase and Luiz Augusto Cauz dos Santos on north-east Australian *Nicotiana*, and Francis Nge's Pauline Ladiges prize-winning talk on diversification dynamics in the floras of south-west and south-east Australia. Following this, attendees relocated to a social get-together in a new virtual environment called 'gather.town', organised by Lizzy Joyce and Daniel Montesinos. This experience was later described by Hervé Sauquet as "extremely bizarre" and included some of the conferences most memorable moments. Highlights were a recorded rendition of Bob Marley's 'Three Little Birds' by Katharina and her husband (Figure 5), and games of trivia and bingo through which it was revealed that Lars Nauheimer was once a children's winter catalogue model. Towards the end of the gathering, the sound of crashing waves and crickets chirping overcame the virtual environment, and it became almost impossible to converse with other attendees over the noise. Then the platform suddenly crashed and, upon re-entering the virtual world a few



Figure 5 The virtual 'live band' for the social event: Katharina and Ross Nargar sing 'Three Little Birds'

minutes later, rumours were relayed that we had been hacked! - this conference now officially had everything. An inside source has since suggested a theory that this 'mayhem' might have actually been caused by attendees who had accidentally been given gather.town administrator privileges. Regardless, the social event was successfully wrapped up by Lizzy, who proclaimed the *Nauclea Contact Tracers* winners of trivia and Gill Brown as the winner of Bingo.

Katharina heralded the next day of the conference, Thursday, which began with a keynote talk from Kelly Shepherd. Kelly's talk focussed on managing health and work/life balance in academia. Drawing on her own personal experiences and surveys about stress in academia, this was definitely the most inspiring talk of the conference. It also provided yet another opportunity to observe the strong bonds and compassion that exist in our community. Following Kelly, talks for the first half of the day featured research utilising data-rich genomic approaches before a session of speed talks. Here, among others, we heard from Ryan O'Donnell on the *Prostanthera phyllicifolia* complex and Jie Huang on the invasive potential of the mangrove species *Laguncularia racemosa*; both of these student talks were acknowledged respectively as the runner-up and winner of different awards. The final session of the day saw a series of high-powered talks focussed on plant phylogenomics from Weixuan Ning, Bill Baker, James Clarkson and Lizzy Joyce who detailed a brilliant approach to incorporating legacy Sanger data with target capture data to investigate relationships and biogeography in Anacardiaceae.



Figure 6 Kelly Shepherd presents the Nancy Burbidge medal to the 2021 recipient, Kevin Thiele, at the Western Australian Herbarium

Friday, the final day, began with the presentation of the 2021 Nancy T. Burbidge medal to Kevin Thiele. ASBS president Mike Bayly, from a windy gully on fieldwork somewhere in remote northern Australia, provided a recorded introductory/congratulatory video for the event before Michelle Waycott gave a more formal overview of Kevin's achievements. The medal was presented to Kevin in person by Kelly Shepherd (Figure 6) in the atrium of the Western Australian Herbarium, with (presumably) a crowd of colleagues watching from behind the camera. His talk began with an explanation of the important work done to establish several important systematic and taxonomic bodies in the 1960s and 1970s by leaders in Australian biodiversity, before making the argument that right now we are in a time to make an equal advancement to that of 50 years ago. One point that Kevin touched on was the need to re-think the way that taxonomy is presented to those outside the community, a topic that was carried on in the first 15-minute talk of the day by Leon Perrie who, despite some technical difficulties, highlighted the need for taxonomists to be conscious of minimising name changes for general users. Talks for the rest of the day were focussed on *Systematics*, *Taxonomy and Australasian Biogeography*, featuring research on *Eucalyptus*, *Hibbertia* and *Xerochrysum*, among others. Personal standouts were talks from Andrew Rozefelds, who presented the first macrofossil evidence of *Nothofagus* from northern Australia, and Heidi Meudt, who presented an integrative

study of polyploidy on islands that found a strong link between polyploidy and diversification of endemic taxa. Rob Smissen also showed off his multitasking skills by giving a talk on *Pseudognaphalium* whilst simultaneously presenting a new hammer-themed t-shirt design (Figure 7).

And so, the final moments of the conference were upon us. Hervé and Lizzy helped us relive the memories with summaries of their favourite conference moments. Awards were awarded and thanks were given to all those who had helped make the event possible. Ultimately, proceedings were wrapped up by Katharina, Heidi and Darren in succession. I think for all attendees 2021's ASBS conference was even more important than usual; helping to bridge some of the disconnect from our community that has eventuated due to COVID-19 lockdowns, travel restrictions and disruptions. An enormous thank you must go to conference conveners Katharina, Darren, John, Frank and Ashley and the multitude of others who put their souls into this event.

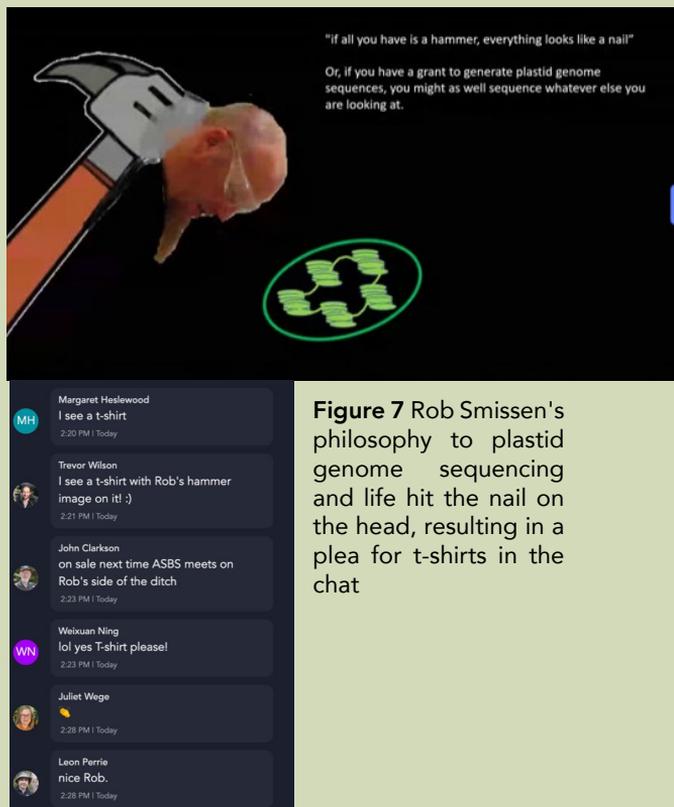


Figure 7 Rob Smissen's philosophy to plastid genome sequencing and life hit the nail on the head, resulting in a plea for t-shirts in the chat

A comment on ASBS2021

Barbara Briggs

I'm an old-timer. I was at the meeting in Melbourne where we discussed Nancy Burbidge's proposal for the formation of a society of plant taxonomists. They were exciting times, when Nancy's initiatives kick-started ASBS, CHAH and ABRS all within a few years. She was right that it was time for these unifying developments that have made Australasian plant systematics the envy of other countries. Since then, I have been at ASBS meetings in Lincoln NZ, Cairns, Melbourne, Adelaide, Canberra and Sydney. So many different themes and opportunities to meet. All owed much to their local organisers and had their highlights, but 2021 stands out with adversity changed into wonderful opportunity.

Unable to meet in person at Cairns, we were freed from the limitations of geography and came virtually from so wide a field and had a feast of presentations. Keynotes on the whole purpose and future of our science mixed with short, focussed talks by research students. Excellent technical support made this possi-

ble and I was surprised at how effective it was to socialise remotely. Particularly memorable for me were Kelly Shepherd's talk and the sessions on PNG botany. Alas, I had to miss Kevin Thiele's Burbidge Lecture (it coincided with a streamed funeral of a friend), but I have heard that it was inspirational.

When ASBS formed we could not imagine how our science would develop, we had no cladograms of DNA-based analyses and 'phylogenetic speculation' was often criticised. Also, the virtual technology and computer analysis programs were far in the future. When, in 1989, our theme was 'Plant systematics in the age of molecular biology' we thought that we must add a 'sweetener' of morphology and biogeography and some came only for the non-molecular part. We could not imagine then how our Society would develop to hold the most vibrant and exciting conference of its almost 50 years. Congratulations to all who made it so good.

2021 Nancy Burbidge Memorial Lecture

Kevin Thiele



Below, we include a transcript of Kevin Thiele's Nancy Burbidge Memorial Lecture delivered at ASBS2021

I am delivering this Burbidge Memorial Lecture from the country of the Whadjuk people of the Noongar nation – the Swan River plain where Perth now stands, and I pay my respect to their elders past, present and emerging.

I would also like to pay my respects to Country, to the lands, waters, plants, animals, fungi and other living organisms that come

together into the Indigenous conception of Country. I hope that all increasingly all Australians will also come to respect and cherish Country, and with cherishing, come to protect it.

Third, I'd like to acknowledge and pay my respects to you, my community. This award is a great honour, and is made more so by coming from a bunch of friends, colleagues and peers. ASBS is a great community.

I plan in this Nancy Burbidge Memorial Lecture to do three things. First, I plan to give a brief retrospective of Australian taxonomy and biosystematics: the '50 years back' part of my title. Second, I'd like to talk a little about the present, and the important work we as a community are doing under the umbrella term 'Taxonomy Australia'. Lastly, I plan to finish with a brief prospective of the next 25 years: the '25 years forward' in my title. This is a very opportune time and occasion to give a lecture based around these three things, as I hope you'll come to see.

First, the retrospect.

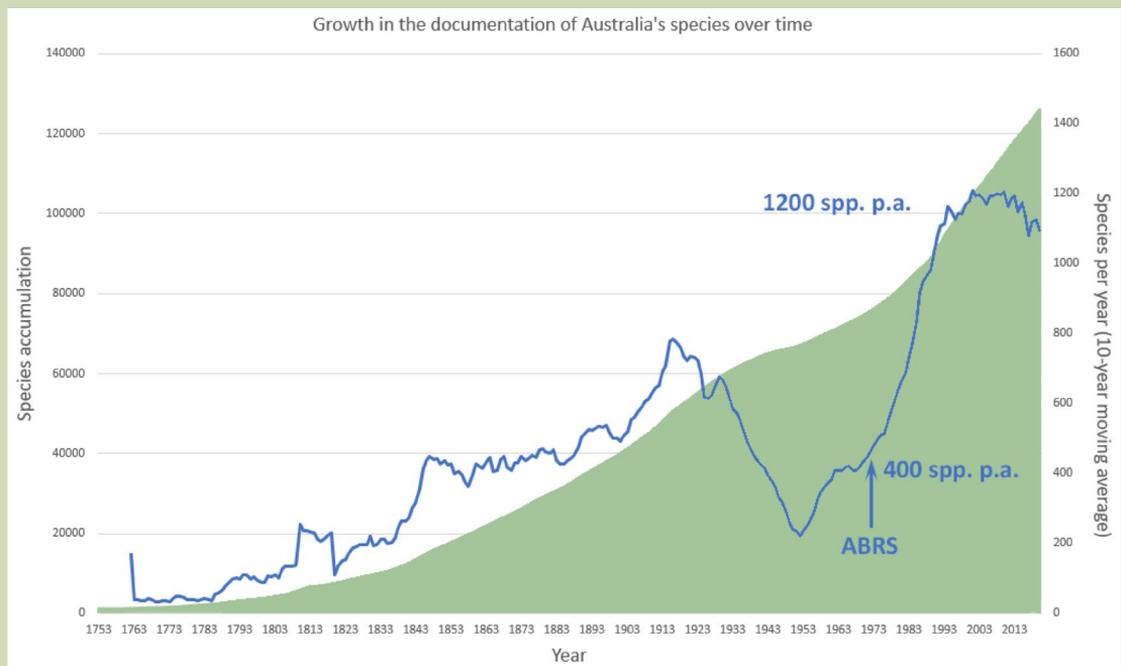
Fifty years ago, the documentation of Australia's biodiversity was transformed by the establishment of the Australian Biological Resources study (in 1973), the Australian (later Australasian) Systematic Botany Society (also in 1973), and the Council of Heads of Australian (later Australasian) Herbaria (in 1972). This was a remarkable confluence of significant events. Why did they all happen in those few years around fifty years ago, and what does it signify about that time? For context, we need to go back a decade, to the early 1960s. These of course were the post-war years, a boom time of white picket fences, the Menzies governments, a rapidly growing economy, and a rapid expansion of agriculture and urban sprawl. These were, of course, accompanied by a rapid and accelerating destruction of Country and its lands, waters, plants, animals, fungi and other organisms. Against this backdrop, a group of visionary leaders and scientists began to be concerned that we knew bugger-all about

Australia's biodiversity. These scientists - Nancy Burbidge, Selwyn Everist, Hansjoerg Eichler, David Ryde, David Catcheside and many others - recognised that there was a great need for a concerted program to document our rich biodiversity before it was too late. They began a sustained, strategic and canny advocacy campaign, gaining important support along the way from significant figures such as Macfarlane Burnet and Frank Fenner from the Australian Academy of Science and the Australian & New Zealand Association for the Advancement of Science, and from international scientists such as William Stearn, who delivered a timely lecture in Australia at the invitation of the Academy of Science. The result of more than a decade of advocacy was that in the lead-up to the 1972 federal election (the "it's time" election) both political parties offered election commitments to establish a new program of documentation of Australia's biodiversity.

Think about that - both parties took essentially the same commitment to the election, which in effect meant that whichever party won, something would (at least, should) happen. This took a great deal of strategic diplomacy and behind-the-scenes advocacy, backed up by good messaging and a clear vision of a program of change. Gough Whitlam won, and of course the rest is history. Shortly after the election, the first steps were taken that led to the establishment of ABRS and the *Flora and Fauna of Australia* series. The result was a sustained thirty years of acceleration in the discovery and documentation of Australia's species and other taxa.

This was a remarkable achievement. Between 1973 and 2000 the annual rate of discovery and naming of the species tripled, from around 400 to around 1,200 species per year). Think about this - every year we increased the annual rate of discovery, for 30 years running. This was a significant achievement.

And at the same time, ASBS & CHAH were



Above A slide from Kevin's lecture that shows the growth in the documentation of Australia's species over time and in relation to the establishment of ABRS

established, with the aim to support and facilitate this rising tide of important activity and extraordinary productivity.

Of course, the establishment of ABRS was not the sole factor – the support from the Commonwealth was leveraged into by the states, who also made unprecedented investments into the state and territory museums and herbaria at this time. But – it didn't last of course. At around 2000 the annual investment into ABRS proved insufficient to keep the trend going and the annual rate of description of new species began to flatline. This is not surprising, because ABRS funding declined in real terms. The oomph had gone; the glory days didn't last. But the fact of the achievements between 1972 and 2000 cannot be diminished.

Fifty years on, "it's time" again. It's time for another renewal, another acceleration, another transformation, another step change. And just as was the case in 1972, there is a great urgency to do this. Just as then, the pressures on Country and biodiversity are great – indeed they have never been

greater.

So how can we achieve another 'it's time' moment?

The taxonomy and biosystematics community is tremendous. Our science is foundational. We deal with one of the most complex systems known to humans, and by our work we draw the 'map' that others use to navigate that incredibly complex system – life on Earth – without getting lost in the complexity. But – there are also tendencies within our community that hold us back.

When we were writing the decadal plan, comparisons were often made between the astronomy and taxonomy sectors. From our community, the astronomers seem to be incredibly successful at convincing government to invest big dollars – in giant radio telescopes, gravity wave detectors and other big-science projects. Perhaps the reason is that astronomers are good at telling big-picture stories to the community and to decision-makers. Astronomers by their nature tend to look outwards and upwards.

We tend to look at the detail, and sometimes look inwards rather than outwards. We sometimes have trouble explaining the wood for its trees. The same comparison – between the relative success of astronomers and the difficulty of gaining attention for taxonomy was made fifty years ago also! Times really don't change much.

The lesson learnt by those leaders – Nancy Burbidge, Mac Burnett and the others – fifty years ago was simple: it's all about the messaging. An effective message needs three parts – a problem, a solution, and a plan. And all these need to be simply stated and digestible by people outside our sector. The problem is that after 300 years an estimated 70% of Australia's species remain undiscovered and undocumented, and this has serious consequences for the sustainable management and protection of Australia. The solution is new technology: for the first time in history we have an almost embarrassing abundance of new technologies, from high-throughput genomics to high-end computing, at hand to solve the problem. And the plan is the Taxonomy Australia mission to discover and document all remaining Australian species in a generation. A problem, a solution and a plan, all simply stated and understandable. And these are the ingredients we need to improve our messaging. Without these, taxonomy is often seen as a 'forever science'. Compare: "we plan to discover and document all Australian species in a generation" with "we plan to continue doing more or less what we've been doing for the last 300 years, for another 400" – and ask yourself which is likely to be the more effective message.

With this in mind, all we need to do are to work through the consequences: what do we actually need to do to achieve the necessary acceleration? We need to believe we can do it, then work out how. And, we need unanimity and uniformity in our messaging.

A quick digression about the relevance of all this to botany. It's likely that even without a major acceleration we're on a pretty good

track to complete a first-pass documentation of Australia's vascular plants in the next generation. This may lead some to get nervous and imagine that the Taxonomy Australia mission is "all about insects". The nervousness is that the mission will see a major diversion of resources from e.g. plants to the hyperdiverse groups such as invertebrates and fungi. This is a misconception. While dealing with the hyperdiverse groups is clearly critically important, the mission is to discover and document our biodiversity! Documentation is just as important as discovery, and there's still plenty of that for all to do.

So that's the present and the reasoning behind our Taxonomy Australia work and the decadal plan and mission. Now let's look briefly at the next 25 years.

Imagine if, within the next 25 years we build a complete DNA sequences library and phylogeny of all named Australian species. What a difference that would make to our discipline. And of course, this is already happening, particularly through the GAP project. Now imagine that we build a comprehensive identification and diagnostic system that will allow anyone, anywhere, anytime, to identify any species. What a difference that would make. And imagine that we build a comprehensive Australian Biodiversity Knowledge Graph that encompasses all our biodiversity data, all managed better. Imagine what a difference that would make. All these would allow our curve – the annual rate of discovery and documentation of Australian species and other taxa – to turn up again, even more steeply this time.

Of course, all this will need investment, from governments, the community, and industry. I believe building support for these investments is possible, with the right messaging about the problem, the solution, and the plan. With these, we can talk about the future, and it will be a different conversation.

Of course, this will all be hard, because we're trying to solve a wicked problem. But



Left The photograph of Nancy Burbidge (1912-1977) shown in Kevin's lecture

the lessons of fifty years ago are that we can do it.

Nancy Burbidge, as mentioned, was one of the leaders of the advocacy that led to the establishment of ABRS, and an equally driving force behind the establishment of ASBS and CHAH. Nancy was strong, forthright, and knew her mind, was sharp as a tack, and intellectually impressive. She had a glass-half-full personality, and was an early

adopter of modern views and perspectives including ideas like the importance of mentoring women in science that were not yet mainstream. She was positive, forward-looking, and outward-looking. We need to be the same.

Thanks for listening, and thanks for the honour of this award.



WILLIAM T COOPER

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Evolution of Australian sundews—the genus *Drosera*

Luis Williamson School of Biological Sciences, The University of Adelaide

Introduction

Drosera L. is a cosmopolitan and species-rich group of carnivorous plants, with centres of diversity in southwest Western Australia, South Africa and South America. The most speciose clade of sundews in Australia is the tuberous *Drosera* subg. *Ergaleium* Planch. (~70 spp.), a group which comprises almost half of the total *Drosera* species diversity in Australia (~160 spp.) (Lowrie et al. 2017a; Lowrie et al. 2017b).

In the absence of a detailed molecular phylogeny, Australian *Drosera* spp. are predominantly defined by morphological and cytological characters. Previous molecular studies of the *D. binata* Labill. complex show that morphological approaches are potentially unreliable, as proposed species boundaries may not strictly align with morphological characters (Williamson et al., unpubl. data). The variation exhibited within and between closely related *Drosera* species is somewhat unclear for many species com-

plexes. A molecular phylogeny is required to resolve the evolutionary relationships between many of the Australian subclades.

To this end, a major component of my PhD research involves the generation of a broad scale molecular phylogeny for Australian *Drosera* species. The phylogeny will include multiple samples of as many Australian *Drosera* species as possible, representing much of the geographic and morphological variation found across the range of each species.

As part of my PhD project, new *Drosera* collections are being co-collected with a poorly understood group of dicyphine mirids. These mirids, commonly known as sundew bugs (*Setocoris* spp.), avoid capture by mucilaginous *Drosera* trichomes and feed on prey captured by their host *Drosera* (Figure 1). Three *Setocoris* species have been described (*S. russelli*, *S. droserae* and *S. byblichilus*) from Western Australia (China and Carvalho 1951; China 1953), however



Figure 1 New host associations between *Setocoris* and *Drosera* in South Australia. Adult *Setocoris* on *D. hookeri* at Mark Oliphant Conservation Park, South Australia (left) and subadult on *D. whittakeri* at Tothill Range, South Australia (right). *Setocoris* pictured are approximately 2 mm in length. Photos by Luis Williamson.



Figure 2 Members of the *Drosera whittakeri* complex. **A** *Drosera aberrans*, Monarto, South Australia. **B** *Drosera praefolia*, Woodcroft, South Australia. **C** *Drosera schmutzii*, Kangaroo Island, South Australia. **D** *Drosera whittakeri*, Onkaparinga River National Park, South Australia. Photos by Luis Williamson.

the genus is widespread and can be found on *Drosera* across much of Australia. The *Drosera* samples and co-collected *Setocoris* samples will later form a significant component of co-phylogenetic analyses in our broad scale phylogenetic study. In collaboration with Prof. Gerry Cassis at UNSW and other collaborators at USYD and RBG, these co-phylogenetic studies will test for evidence of co-speciation, host shifts and other evolutionary processes occurring at fine scales.

Project aims

The awarding of an Australasian Systematic Botany Society (ASBS) Hansjörg Eichler Research Grant has allowed me to undertake a more detailed investigation of the relationships among tuberous sundew species in *Drosera* subg. *Ergaleium*. The genus-wide phylogenetic analysis being undertaken has provided the appropriate stem tree structure to test relationships among closely related tuberous *Drosera* species. In particular, I am evaluating the species diversity present in the *Drosera whittakeri* species complex, comprised of four closely related taxa— *D.*

aberrans, *D. schmutzii*, *D. praefolia* and *D. whittakeri* (Fig. 2). This group of tuberous rosetted *Drosera* has a strong presence in South Australia, making it an excellent focus for this study.

Methods and results

To date, we have collected approximately 160 *Drosera* samples from Western Australia, many of which have associated *Setocoris* samples (which are being curated by Prof. Gerry Cassis). At this stage, the *Drosera* diversity in South Australia is well represented in our collections, with fresh material of all recognised species found in South Australia, excluding *D. finlaysoniana*. My own collections include samples from the Northern Lofty, Southern Lofty, South-Eastern and Kangaroo Island botanical regions, with associated *Setocoris* samples from 8 different host *Drosera* species. This includes multiple collections of all nine tuberous South Australian species, i.e. *D. aberrans*, *D. auriculata*, *D. gunniana*, *D. hookeri*, *D. macrantha* ssp. *planchonii*, *D. praefolia*, *D. schmutzii*, *D. stricticaulis* and *D. whittakeri*. Where possible, specimens were obtained from the type locations of each species.

These fresh collections have been supplemented with approved destructive sampling of a further >120 herbarium samples from across Australia and overseas, which I was kindly granted permission to sample by the State Herbarium of South Australia.

DNA sequencing was conducted following the methods developed in the Waycott group (Nge et al. 2021) using both chloroplast and nuclear baits. The target gene regions in both bait sets (30 chloroplast genes and 100 nuclear genes) provide a significant phylogenomic data set for use in phylogenetic analyses. For example, previous research into the *D. binata* (syn. *D. pedata* to be validated) complex (Williamson 2018) has shown that population level differences can be discriminated with high support values by including at least 31 gene regions (13 nuclear and 18 chloroplast).

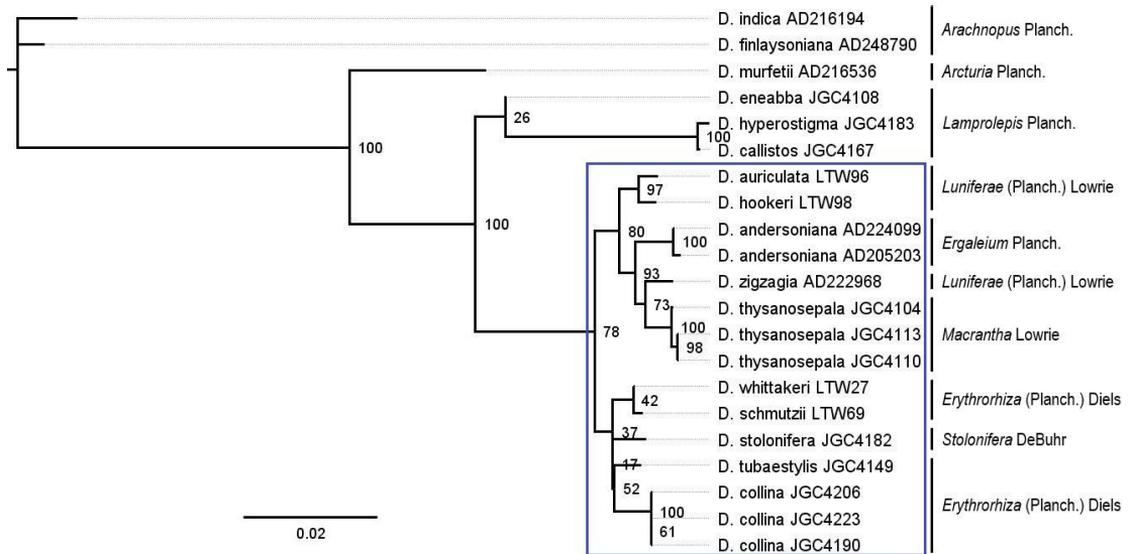


Figure 3 Preliminary PHYLML maximum likelihood *Drosera* phylogeny from *matK-psbA* and *trnL* sequence data, with bootstrap values shown adjacent to nodes. Tuberous *Drosera* (subg. *Ergaleium*) are outlined with a blue box, including samples of *D. whittakeri* and *D. schmutzii*. *Drosera* sections *sensu* Lowrie (2013) are shown to the right.

The data we have generated to date is high quality, with most samples yielding hundreds or thousands of reads per gene region. A large quantity of sequence data from a total of 240 *Drosera* samples, including material for both my broader PhD project and the ASBS Hansjörg Eichler Research Grant, has been returned to us and is awaiting *de novo* assembly, mapping, alignment, quality checks and phylogeny reconstruction.

Preliminary analysis results based on a growing data set are presented here (Fig. 3) for 3 chloroplast gene regions, which are currently being worked on bioinformatically. This data set has been assembled from trimmed and concatenated *matK-psbA* (3,163 bp) and *trnL* (1,321 bp) chloroplast sequences, representing only a very small portion of the generated data. These early phylogenetic analyses are consistent with a previous honours student study (Hewson 2017) that found infragenic relationships within major *Drosera* clades are often poorly resolved when only a few genes, or single gene regions (e.g. 659 bp *rbcl* sequences), are used to generate *Drosera* phylogenies. Nevertheless, even the limited data set presented here extends our understanding of

the relationships in the group.

As expected, most subgenera form clades in this preliminary phylogeny (Fig. 3), but infragenic relationships are supported with low likelihood values and there were also some unexpected results. For example, *D. zigzagia* AD222968 and *D. stolonifera* JGC4182 are placed in surprising positions in the phylogenetic tree. We should carefully interpret these results alongside additional nuclear and chloroplast gene regions from representatives of sections *Luniferae* (Planch.) Lowrie and *Stolonifera* DeBuhr that have been included in ongoing analyses. There is a possibility that refinement of the data set with different loci and genomic compartments will see these relationships better resolved according to current concepts (Lowrie 2013; Lowrie et al. 2017a; Lowrie et al. 2017b).

Acknowledgements

I would like to acknowledge and thank the Australasian Systematic Botany Society for the financial support provided by the Hansjörg Eichler Scientific Fund. These funds have allowed me to include further tuberous *Drosera* samples and, as my project

continues, will enable me to understand the evolutionary relationships between these closely related taxa in greater detail. I would like to thank my supervisors Prof. Michelle Waycott and Dr. John Conran for their overall project support, as well as Dr. Kor-jent Van Dijk and Dr. Ed Biffin for their lab and bioinformatics support. I would also like to acknowledge the institutional support of the State Herbarium of South Australia, which has proved an invaluable resource for my PhD research.

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ASBS Early Career Researcher Feature: Francis J. Nge

Each issue *ASBS Newsletter* is featuring the work of one of our many talented students and ECRs. Who better to kick off this section with than the ASBS2021 Pauline Ladiges Prize winner, Francis Nge. Francis' PhD undertaken at The University of Adelaide and State Herbarium of South Australia was conferred in August 2021. He is currently a postdoc in the Waycott Lab at the University of Adelaide until he begins his next postdoc working on Annonaceae and tropical rainforest evolution in the Couvreur Lab (France) in November. Congratulations Francis!

Major research themes and interests?

Plant macroevolution, systematics and taxonomy

Current study species/system?

The Australian temperate flora, with a particular focus on Myrtaceae (*Calytrix*), Proteaceae (*Banksia*, *Adenanthos*, *Isopogon*,

Petrophile, Rhamnaceae (Pomadereae tribe), Rutaceae (*Boronia coerulescens* and *B. inornata*)

The Australian temperate flora is interesting as it is quite diverse floristically by global standards. Indeed, the Australian temperate region contains two global biodiversity hotspots – indicating both its high plant diversity as well as increasing threats. Studying why our temperate region (and southwest Western Australia in particular) is botanically diverse and how they differ with other regional floras has been the main research topic of interest for my PhD, as well as current and future research focus.



Calytrix harvestiana (Myrtaceae), at Kalbarri WA. Photo: Francis Nge

Recent paper: linking plant nutrition and diversification in Proteaceae

Hayes, P. E., **F. J. Nge**, M. D. Cramer, P. Finnegan, P. Fu, S. D. Hopper, R. S. Oliveira, *et al.* 2021. Traits related to efficient acquisition and use of phosphorus promote diversification in Proteaceae in phosphorus-impooverished landscapes. *Plant and Soil* 462: 67–88.

What are the main findings of this paper?

I co-lead this study as co-first author, where we looked at how different nutrient acquisition and nutrient use strategies affect the diversification of Proteaceae at a global scale.

This study comprises an interdisciplinary team across the globe that incorporates

eco-physiological trait data for Proteaceae in an evolutionary context. To our knowledge, this is the first study to examine the effects of physiological traits relating to nutrition acquisition strategy and adaptation, on the diversification and evolution of a study group.

One of the unexpected and interesting outcomes from this study was that southwest Australia not only contains genera with high P-nutrient efficient use (i.e., lower leaf [P] and higher seed [P]) correlated with higher diversification rates. But the region also contains genera with low diversification rates and species-poor lineages (e.g. monotypic genera). Additional research is required to investigate this further, for example, are there clade-specific competition across Proteaceae that encouraged the diversification of some lineages while suppressing others?

The study demonstrates a significant link between the physiological adaptations of different plants with their environment, and how this affected their evolution through time.

What is the next step in this research?

We now aim to continue with this research across more finer scales – within genera, to test for more recent diversification dynamics. We have physiological trait data for *Banksia*, *Grevillea*, and *Hakea*, and are currently collaborating with others (e.g. Cardillo lab at ANU) to integrate these traits onto densely sampled species-level phylogenies for these groups to test these hypotheses further.



Francis (left) attending the IBC 2017 Nomenclature Section, with Jeffrey Prado (right)



Francis photographing a cushion plant, on a cushion plant in Tasmania. Photo: Raees Khan.

These results can then also be linked to other variables to look at the niche-evolution of these groups (e.g., temperature, precipitation variables across their distributional range).

If you could study any organism on Earth, what would it be and why?

I really like tropical rainforest systems because they are so hyper-diverse. Currently, if given a chance to work on any group. I would pick Gesneriaceae or Zingiberaceae! Since they have spectacular flowers and diverse growth forms. And they are often overlooked – most tropical rainforest studies currently focus on trees (Dipterocarpaceae, palms etc.) instead of herbaceous understorey plants. Also, a lot of Gesneriaceae species grow on specific

edaphic habitats e.g. limestone karst systems in South East Asia. Doing fieldwork in these places would be a challenge but well worth it!

Follow Francis and find out more about his research here:

Researcher Profile: <https://researchers.adelaide.edu.au/profile/francis.nge>

ResearchGate: <https://www.researchgate.net/profile/Francis-Nge-nijisheng>

Twitter: @jason_nge – https://twitter.com/jason_nge

Instagram: @francisnge – <https://www.instagram.com/francisnge/>

Selling systematics with storytelling: solving taxonomy's marketing problem

Ryan P. O'Donnell

“What is a taxonomist?”

Put simply, a [taxonomist](#) is a biologist whose aim is to name and describe the diversity of life on Earth. At least once a year, a beleaguered taxonomist will emerge from their many drawers of carefully curated specimens to publish another explainer article answering this question. Within these articles, we can observe some thematic trends: [taxonomy not being the science of tax](#), an unusual preoccupation with [invertebrate genitals](#), or the [importance of natural history collections](#).

Within the public eye, taxonomy appears to be falling into [disrepute](#). Taxonomists have a reputation for being a finicky ‘nuisance’ — pedants preoccupied with perpetual name changes. Media attention is occasionally garnered, rarely for the discovery of a new cancer-curing fungus or delicious new mint; rather, for a new species having been named after a [nefarious despot's genitalia](#) or a Hollywood [odd-couple](#).

This tongue-in-cheek approach invariably results in burying the lede, which is that both [taxonomy](#) and [biodiversity](#) itself are in crisis. Current estimates of the number of species on Earth range from [5 million](#) to almost a [trillion](#), of which only 1.5 million have been described. Overwhelming evidence suggests that Earth's next great mass extinction event has [already arrived](#), leading some scientists to cast aside their usually measured tone to declare [“biological annihilation”](#).

This taxonomic timebomb has been pressurised by a steady decline in the taxonomic workforce, a decline in taxonomic education, and governments that are actively antagonistic to biological and environmental sciences. In 2020, Australian universities were hit with an almost [30% cut in funding to biological](#)

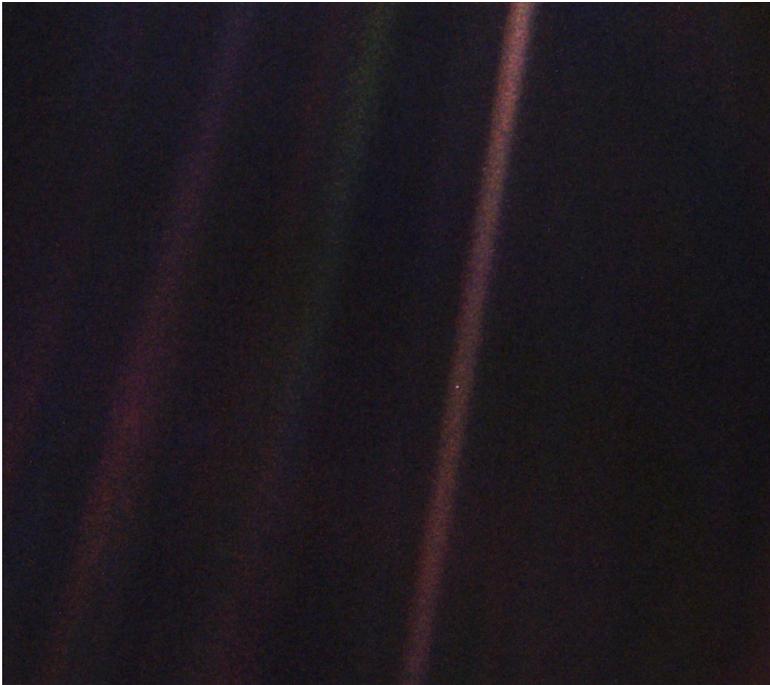
[and environmental sciences](#), despite [substantial financial initiatives aimed at the STEM sector](#) announced in the same breath.

These are important arguments, but their sheer repetition may just be another contributing factor to audience [“green fatigue”](#) — the overwhelming feeling of hopelessness and demotivation that comes with information overload and failure to see tangible change.

Oprah Winfrey colloquially distils what psychologists call the Stereotype Threat: “what we dwell on is what we become”. Is it possible that we as taxonomists might be partly to blame for our dwindling public perception? How can we hope to sway public opinion when our very own words paint us as nothing more than punctilious pensioners leering down the barrel of a microscope at an insect's unspeakables? Thanks to these articles, the task of explaining what a taxonomist is has arguably been completed.

But what about a systematist?

While taxonomy and systematics are often used interchangeably, there is a slight difference. Taxonomy represents one branch of the wider tree of systematics. Broadly, [systematics](#) aims to discover, classify, and interpret the diversity of all life on Earth and infer the evolutionary history behind these organisms. Systematists ask questions like who is related to what, why does this species look like that, what causes species to diversify, and how long has this been going on? Where taxonomy gives names and faces to its characters, systematics provides their dramatic backstory. Systematists then, are the storytellers. Systematics has arguably never been more visible than this moment, with phylogenomic techniques in the daily spotlight telling the



Left The image that came to be known as “Pale Blue Dot.” It was captured on February 14, 1990, by NASA’s robotic explorer Voyager 1, and inspired the famous passage by late astronomer Carl Sagan in his 1994 book

story of evolution in real time as we track the spread of COVID-19 across the globe.

The power of storytelling

In any story, characters cannot function without narrative, and narrative cannot function without characters. The same applies to taxonomy and systematics more broadly. Taxonomy cannot survive without context and we must take a more wholistic approach to how it is presented.

Humans are [natural storytellers](#). As any scientist can attest to, the presentation of cold, hard [evidence rarely sways sceptics](#). However, audiences are captivated by compelling stories, and it has been repeatedly demonstrated that [effective storytelling results in the building of empathy](#) and real-world, [tangible policy change](#).

As scientists we have been told to abstain from magniloquent language, but I argue here for the contrary. [Imagery and metaphor are vital for affect](#). In the words of Dr Devon Price, [we need to make time for awe](#):

“Awe reminds us of the universe’s largeness and our own smallness, in a way that

feels exhilarating and soothing rather than threatening. When we feel awe, all our individual problems and worries can seem to drop away, because the vast beauty around us puts everything in perspective.”

Astronomers have mastered the art of inspiring awe, and this capacity for storytelling may account for the startling disparity in funding between astronomical and biological sciences. The emotional impact of Carl Sagan’s immensely humbling [Pale Blue Dot](#) monologue is [still being felt decades later](#). These same grand, arching narratives spanning vast multi-billion-year timescales are also present in biology — we just need to tell them.

In [Braiding Sweetgrass](#), Robin Wall Kimmerer notes that in Western tradition, humans see themselves at the pinnacle of the evolutionary hierarchy. In her Native tradition, however, humans are merely infants on the cosmic timeline. We thus have the most to learn and must look to other species for guidance. We must look to taxonomists and systematists to give a voice to these organisms, so that they too may share their stories.

In the beginning...

John Clarkson

In the last issue of the *Newsletter*, Alex George traced the origin of ASBS to a letter dated 29 April 1971 sent by Jim Willis, the Assistant Government Botanist, and Acting Director of the Royal Botanic Gardens and Herbarium, Melbourne, to all Australian plant taxonomists. Alex also reproduced the minutes of the inaugural meeting of the Society held at the National Herbarium, Melbourne, on Saturday 7 April 1973.

Documents have come to light since which shed light on what happened in the two years between Jim's letter and the meeting in Melbourne. Just last month, Kirsten Cowley (CANB) found a few, but much earlier, in 2018, while searching the library archives at the Australian National Herbarium for examples of botanist's handwriting, Murray Fagg (ANBG) found, amongst a collection of papers relating to the late CANB staff member Andrew Kanis, a folder labelled 'ASBS'. In this, all neatly sorted, was correspondence relating to the formation of the Society. Murray used this to compile a concise history of the Society for the ASBS web page but, for some unknown reason, this was never made public. Council is working to address this, and it should be available soon. In the mean-time, parts of Murray's history are reproduced here.

Before the formation of ASBS, the voice of the plant taxonomic community in Australia was largely through the Systematic Botany Committee of ANZAAS (the Australian and New Zealand Association for the Advancement of Science). Following the Second World War, this Committee produced a newsletter, *Australasian Herbarium News*. Issued in fourteen parts from June 1947 until February 1954 ([Web link 1](#)), the February 1954 newsletter is labelled 'final edition'.

The 43rd ANZAAS congress was held in Brisbane in May 1971. In response to Jim Willis's

letter, those attending the meeting of the Systematic Botany Committee agreed in principle to the formation of a society for those interested in taxonomic botany in Australia. Shortly after the congress, Nancy Burbidge, a senior principal research scientist based at the Australian National Herbarium in Canberra* and President of Section 12 (Botany) of the 43rd ANZAAS congress, circulated a document (undated) with the title: *A Society for Those Interested in Taxonomic Botany in Australia* ([Web link 4](#)). A questionnaire was also circulated ([Web link 5](#)).

Nancy sent a letter, dated 19 August 1971, to all those who responded to the questionnaire ([Web link 6](#)). In it, she sought nominations for committee members of such an association. Attached to the letter, was a very detailed report on the responses to the questionnaire ([Web link 7](#)).

At the botany meeting associated with the 44th ANZAAS congress held in Sydney in 1972, Roger Carolin (USYD) and Don Blaxell (NSW) were asked to draw up a draft constitution for the proposed association (Churchill 1973). Once prepared, the draft rules ([Web link 8](#)) were circulated widely and comment invited. Discussions were held at meetings in at least three cities:

Brisbane in January 1973 ([Web link 9](#))

Melbourne 1 February 1973 ([Web link 10](#))

Canberra 21 March 1973 ([Web link 11](#))

Soon after, David Churchill (MEL) circulated a document (undated) titled, *Proposed Association For Australian Plant Taxonomists - Inaugural Meeting* ([Web link 12](#)), which was to be part of a weekend get-together on 7-8 April 1973 ([Web link 13](#)). The meeting, to be held on Saturday 7 April 1973 at 2:00 pm, was for the purpose of launching a society for Australian plant taxonomist. At the meeting, chaired by Carrick Chambers, then the Professor of Botany at the Universi-

ty of Melbourne, the name of the society was settled, a Council of six members elected, and the draft Constitution and Rules drawn up by Professor Dennis Carr of the Australian National University was adopted. These were the minutes reproduced by Alex George in the last issue of this *Newsletter*. A digital copy of these minutes and the draft Constitution and Rules is available ([Web link 14](#)).

It was left to this Council to draw up the best possible Constitution to be put forward at a General Meeting of the new Society planned to coincide with the 45th ANZAAS congress to be held in Perth the following year. That first General Meeting of ASBS was held in Perth on 17 August 1973 and, as they say, “the rest is history”.

Footnote

*Until 1984, the Australian National Herbarium was known as Herbarium Australiense. The name change was officially gazetted on 26 June 1984 ([Web link 2](#)) on the recommendation of the then Director, Bryan Barlow ([Web link 3](#)).

References

Churchill, D.M. (1972). Proposed association for Australian plant taxonomists. ([Web link 12](#))

Web link 1 <http://www.asbs.org.au/newsletter/aust-herb-news/index.html>

Web link 2 <https://www.anbg.gov.au/cpbr/history-cpbr/ANH-GovGaz-26June1984.jpg>

Web link 3 <https://www.anbg.gov.au/cpbr/history-cpbr/ANH-GovGaz-26June1984.pdf>

Web link 4 <http://www.asbs.org.au/history-ASBS/Taxonomic-Society-ANZAS-1971.pdf>

Web link 5 <http://www.asbs.org.au/history-ASBS/Burbidge-Questionnaire-1971.pdf>

Web link 6 <http://www.asbs.org.au/history-ASBS/Burbidge-Committee-19-08-1971.pdf>

Web link 7 <http://www.asbs.org.au/history-ASBS/Taxonomic-Survey-Results-19-08-1971.pdf>

Web link 8 <http://www.asbs.org.au/history-ASBS/Burbidge-draft-rules.pdf>

Web link 9 <http://www.asbs.org.au/history-ASBS/Draft-Rules-comments-BRI-Jan-1973.pdf>

Web link 10 <http://www.asbs.org.au/history-ASBS/Draft-Rules-comments-MEL-1-Feb-1973.pdf>

Web link 11 <http://www.asbs.org.au/history-ASBS/Draft-Rules-comments-CANB-21-March-1973.pdf>

Web link 12 <http://www.asbs.org.au/history-ASBS/Churchhill-notice-Inaugural-Meeting-7-April-1973.pdf>

Web link 13 <http://www.asbs.org.au/history-ASBS/Churchhill-programme-Inaugural-Meeting-7-8-April-1973.pdf>

Web link 14 <http://www.asbs.org.au/history-ASBS/Minutes-Inaugural-Meeting-Const-Rules-7-April-1973.pdf>

Two centuries on: the iconic ‘Mermaid’ boab tree in the Kimberley

Kevin Kenneally University of Western Australia and Nulungu Research Institute, Notre Dame University Australia

Cathie Clement Consulting Historian, Perth

September of 2020 marked the bicentennial of the careening and repair of Lieutenant Phillip Parker King’s survey vessel, His Majesty’s Cutter *Mermaid*, at Careening Bay (located within the Prince Regent National Park in the northwest Kimberley). During

their stay, a large boab was inscribed ‘HMC MERMAID 1820’. Commemorative events organised by the Department of Biodiversity, Conservation and Attractions (DBCA) were to be held at the ‘Mermaid Tree’ and at the Fremantle Maritime Museum in September



Above The mermaid tree. Photo by Chris Done.

2020 but, due to the COVID-19 pandemic, neither event took place.

It is difficult now to visualise the courage, skill and ingenuity of the *Mermaid's* officers and crew in their unassisted maritime survey work on remote parts of the Australian coast. Likewise, the hardships they endured. But the importance of Careening Bay in Western Australia's science and conservation history and the role of Indigenous crew members is being recognised and honoured. The significance of the charts prepared and the plant and animal specimens collected on King's voyages has often been overlooked but their discoveries are now being acknowledged. In *King of the Australian coast*, Marsden Hordern wrote: 'Countless ships, guided safely through dangerous waters by his charts, have reached their desired havens.'

King entered service in the Royal Navy in 1807, became a midshipman, and was

promoted to Master's Mate in 1810 and Lieutenant in 1814. In 1811, an ailing Matthew Flinders (1774–1814) took him to a meeting with the eminent botanist Sir Joseph Banks, Rear Admiral Bligh (of 'Mutiny on the Bounty' fame), and the Royal Navy hydrographer Captain Thomas Hurd. This introduction led to Britain appointing King, on 8 February 1817, to complete the exploration of 'that part of the Coast of New Holland ... not surveyed or examined by the late Captain Flinders'. It was considered desirable for the continent to 'be circumnavigated by some person competent to complete the task'.

King was well connected. He was the first legitimate child of Philip Gidley King, third Governor of New South Wales from 1800–1806. His godfather was Arthur Phillip, the first governor. Flinders had returned to London in 1810, having circumnavigated New Holland (Australia) on HMS *Investigator*, without fully exploring and surveying



Above Philip Parker King, about 1816. Artist unknown.

its coastline, in 1801–1803. Botanist Robert Brown (on the recommendation of Sir Joseph Banks) had accompanied Flinders on that voyage. Brown made extensive plant collections, most of which were new to science.

There was some urgency in getting King's expedition underway. England's old rival France was showing renewed interest in the southern hemisphere. The *Géographe*, the *Naturaliste* and the *Casuarina*, under the command of Nicolas Baudin, had surveyed the New Holland coast in a rudimentary manner between 1801 and 1803. In 1817, Louis De Freycinet, who had served under Baudin, left France in command of the 350-ton corvette *Uranie*, arriving off the western coast in September 1818. There is no evidence in French archives to suggest that there were political objectives in Freycinet's voyage. Its purpose was to engage in scientific discovery.

Banks advised botanist Allan Cunningham that not science alone, but also politics, lay behind King's grand surveying expeditions; a notion of anticipating and scuppering any plans the French might have for claiming the area. King and his crew were to complete

three voyages around Australia and one to Tasmania in HMC *Mermaid* and His Majesty's Brig *Bathurst* between December 1817 and April 1822. These voyages were extremely hazardous with numerous groundings, near shipwrecks on reefs, raging tides, legendary whirlpools, a strange flora, encounters with wildlife, and numerous contacts with the indigenous inhabitants.

To begin, King sailed from England, arriving at Port Jackson (Sydney Harbour) in September 1817. Under Colonial Office instructions, Governor Lachlan Macquarie was to provide the most suitable vessel and a carefully chosen crew. Britain had already supplied copies of Flinders' *A Voyage to Terra Australis*, François Péron's account of Baudin's expedition, Freycinet's *Atlas*, and John Arrowsmith's large chart of the Indian and Pacific oceans.

The 84-ton cutter *Mermaid* was purchased for £2,000. The vessel was small, built of teak, 56 feet (18 metres) from stem to stern and a draught of 9 feet (3 metres). She had a large hold, and King was confident that the vessel could carry stores for 20 men over a lengthy voyage. He remarked ruefully that there was barely room for the mess table in the only day cabin.

One Admiralty requirement was that King adhered to 'the regulations for preserving health, cleanliness and good order, which have been established in His Majesty's Ships when employed on Voyages of Discovery'. He did that with as varied and nutritious a diet as possible. A bonus on this expedition was 300 cases of preserved food made by the English firm of Donkin, provided courtesy of the principal naval surgeon, James Bowman. The preserved food helped to break the monotony of biscuits, salt meat and grog. King also found that it prevented the 'excessive and distressing thirst' from which they had suffered on previous expeditions. His gratitude saw him name a Kimberley feature Donkin's Hill.

Another Admiralty requirement was that King

ascertain whether any river was 'likely to lead to an interior navigation into this great continent'. In addition, the Colonial Office had instructed him to collect information about climate, mountains, flora, fauna, timbers, minerals, indigenous inhabitants and possible articles of trade.

In December 1817, King accepted the services offered by Boongaree (also spelt Bungaree), a member of the Kuringgai people from the Broken Bay area north of Sydney. Boongaree was good company and, having sailed with Flinders, he understood naval life. Flinders said he was a 'worthy and brave fellow' and extremely useful when making contact with other tribes. Boongaree's knowledge of natural history and understanding of native foods, herbs, poisonous plants and other strange things likely to be encountered on a voyage also helped to ensure the survival of the ship's crew. In recognition of his services, Boongaree Island, located at the entrance to Prince Frederick Harbour in York Sound, was named in his honour. Boongaree returned to his people at the conclusion of the Second Expedition. On 26 May 1821, a Sydney Aborigine called Bundle (also spelt Bundell), a Dharawal man, offered his services. Bundle was accustomed to life at sea, having served on several colonial vessels, and was regarded as a quick-witted and active seaman. King remarked that he was even 'of much greater service' than Boongaree had been.

The officers and crew aboard the *Mermaid* for the third voyage (14 June to 9 December 1820) comprised King as captain, John Septimus Roe and Frederick Bedwell as master's mates, James Hunter as ship's surgeon, Allan Cunningham as botanist, fourteen sailors and two boys. The men were young: King was 28 years old, and both Bedwell and Roe just 23; Cunningham was 28. The ship's dog was a young Newfoundland named Admiral Benbow. He was a failure as a food provider and, on the next voyage, King replaced him with a setter and a pointer.

While repairs and refitting were being done in anticipation of the third voyage,



Above Allan Cunningham. Portrait by P.P.King.

King instructed that the ship be completely submerged in an attempt to get rid of cockroaches, rats and other vermin. In Roe's words, they had shared the vessel with 'innumerable rats, cockroaches, mice and other vermin, no bugs thank God, which infested her and destroyed our provisions, stores, books, papers, linen and anything they could get at'. King wryly noted that 'it was many months before we were so annoyed by their numbers as had been the case during the last voyage'.

The *Mermaid* left Port Jackson on 14 June 1820, suffered storm damage, and returned to port. On 13 July they sailed again, heading north, but after a week ran aground on a sand bank at Port Clinton (north of present day Rockhampton). King heard a loud crash, and suspected the stern post of the vessel had been damaged, but an inspection revealed nothing. He decided to sail on, unaware of serious damage that would eventually require the vessel to be repaired at Careening Bay.

By 21 September, the *Mermaid* was leaking

at an alarming rate and in danger of sinking. Crew had to leave other duties and man the pumps. As the ship sailed from Prince Frederick Harbour on the north Kimberley coast, King decided that urgent repairs were required. By noon, the *Mermaid* anchored in a sheltered embayment off a sandy beach and the crew unloaded the stores and equipment. The ship's guns were set up on shore to provide a defence. More than fearing attacks by Aborigines, King knew he must be wary of fishing fleets from South East Asia. For centuries, their prahus had been visiting northern Australia at the commencement of the dry season in search of trepang or sea cucumber. In April 1818, King had encountered 15 'Malay' or Macassan vessels anchored off Sims Island (near Arnhem Land). Some were as large as the *Mermaid*, and he estimated that their combined crews would be about three hundred. Understandably, he feared the *Mermaid's* crew being outnumbered.

Careening Bay is in Wunambal country. There is a growing body of information on the extensive interactions between Aboriginal people and Macassan fishermen. The Aboriginal Traditional Owners call Careening Bay Wunbung-gu. Possible evidence of Macassan visits is a semi-circular niche at the rear of the 'Mermaid Tree', purported to be an Islamic mihrab or a prayer alcove. A mihrab is a semi-circular niche in the wall of a mosque that indicates the direction that Muslims should face when praying. It has also been suggested that the niche may have been a focus of devotion for crew members of the

Mermaid who were Catholic. Those men may have conducted their own service separate to King's Church of England Sabbath observance.

On the afternoon of 21 September, as the crew unloaded the *Mermaid*, King and Cunningham went ashore and saw that the hills behind the beach had been 'recently fired by the natives, whose old, temporary huts were standing on the sands'. They had seen few traces of those people; just distant smoke. King described the huts as 'merely strips of bark bent over to form a shelter from the sun'. On the summit of a nearby hill were other substantial huts. One had stone walls about three feet high and saplings 'laid across to support a covering of bark or dried grass'.

A search was made for what Cunningham described as 'that most important article, water'. They were fortunate to discover a continuous supply of excellent fresh water at the base of one of the gullies. This was critical as they had discarded fresh water on board the *Mermaid* in order to lighten the vessel.

Tents were made using the ship's sails. Hunter recorded that near the tents he tried to measure the temperature with his pocket thermometer, but when it reached 130 degrees, he abandoned the test for fear of bursting the tube. Cunningham described the annoyance from sandflies 'which crowded into the tents at dusk' only to be replaced during daylight by flies that 'entered their eyes, nose and mouth!'. Next morning, with a flood tide, the vessel was careened as far up the beach as the water would allow. When the tide receded, an inspection of the hull revealed the extent of the damage. King wrote that it was 'greater even than our fears had anticipated' and that, at first impression, 'there was every reason to fear we could not remedy the defects sufficiently to ensure even an immediate return to Port Jackson'.

However, after further inspection, King believed it was possible for the ship to be repaired to a standard that would allow them to complete their voyage. The stern post



Above HMC *Mermaid* being repaired at Careening Bay. Sketch by P.P. King

repairs were done by the 28th but King then wrote: 'just as we were congratulating ourselves upon having performed them, a fresh defect was discovered, which threatened more alarming consequences even than the other: upon stripping off some sheets of copper, the spike nails, which fastened the planks, were found to be decaying; and ... a straw was easily thrust through the vacant holes'. The hull was patched by the 30th but it was not until October 5 that the tide rose enough to float the cutter.

Their stay at Careening Bay provided ample opportunity to make observations and conduct scientific studies of the surrounding countryside. Cunningham collected and made notes on plants and natural history specimens. He preferred to botanise alone, avoiding the distractions of having to assist King or Roe with surveying requirements. He recorded clumps of *Cycas*, or what he referred to as 'Sago Palm' (*Cycas basaltica*), and noted that the fireplaces near the 'native' huts were 'strewed with the nuts of the sago palm, the fruit of which appears to be generally eaten by the natives of the north and north-west coasts'. The old people of the Traditional Owners' Wunbung-gu and Gural families lived near the grove of Gungurruy (cycads) at the south end of the beach.

King and his crew spent 18 days (21 September to 9 October 1820) at the site he named Careening Bay. One day (2 October) was spent investigating nearby Cliff Island (now Bat Island) where Cunningham collected many new plant specimens and entered a cave full of bats. He also secured, on 28 September, 'a curious Lizard of extraordinary appearance which had perched itself on the stem of a decayed tree'. This was something of a major coup for the voyage's natural history collections. He described it as having a 'curious crenated membrane, like a ruff or tipper around its neck and covering its shoulders'. This was the first collection of the Frilled Neck Lizard. In 1825, Edward Gray, Keeper of Zoology at the British Museum, named it *Chlamydosaurus kingii* in tribute to King.

Cunningham was the first European to collect botanical specimens of the Kimberley boab, although he had observed 'several large gouty-trees' on King's second voyage in 1819. Cunningham noted the tree's resemblance to the baobabs of West Africa but believed, in the absence of flowers and based on the structure of the fruit, that it was a member of the caper family and applied the name *Capparis gibbosa* in his journal. He did not include a description of the tree in King's published account of the voyages, *Narrative of a survey of the intertropical and western coasts of Australia performed between the years 1818 and 1822*. The name was published with a valid description in Heward's biography of Cunningham in 1842. In the interim, as Tony Orchard discovered, Cunningham had drafted a paper comparing his species with the African genus *Adansonia*, but unfortunately it was never published. Cunningham clearly believed that his name *Capparis gibbosa* should be published but his premature death in 1839 resulted in his discovery going unacknowledged. Subsequently, Victorian Government botanist Ferdinand Mueller described the Australian boab in 1857 as *Adansonia gregorii* and this became the accepted name for the species.

On 7 October, Cunningham packed up his plant collections and luggage that he had required ashore. At the end of the voyage, his dried and pressed plants would be sent back to William Aiton and Sir Joseph Banks at the Royal Gardens. His herbarium specimens, numbering several thousand, became the vouchers for the naming of hundreds of new plants. Many of these were published by George Bentham, one of Britain's most influential botanists, in his classic seven volume work *Flora Australiensis: a description of the plants of the Australian Territory*, between 1863 and 1878.

In shady spots near the fresh water, Cunningham had planted seeds of lemons, oranges, Indian corn and some eyes of potatoes that he hoped would become established – for the benefit of future Europeans or even the local indigenous people. Admiralty instruc-

tions stipulated that such things must be 'within the observation and reach of succeeding navigators'. Cunningham also wrote: 'The name of His Majesty's Cutter was deeply carved upon the stem of the largest tree on the shores of Careening Bay, Port Nelson, with certain initials and the date of the year of our visitation'. This was no random act of vandalism by the crew. King was following Colonial Office instructions to 'take care to leave some evidence which cannot be mistaken of your having landed'. In addition, the name of vessel was punched on a sheet of copper and fastened to the stem of a *Hibiscus tiliaceus* growing on the beach. When King returned to Careening Bay ten months later in the *Bathurst*, one corner of the copper sheet had come off. He noted that the 'large gouty-stemmed tree ... seemed likely to bear the marks of our visit longer than any other memento we had left'. In 1893, Aeneas Gunn, the cousin of pioneer pastoralist Joseph Bradshaw, sketched the 'Mermaid Tree' when visiting Careening Bay from their pastoral lease 'Marigui' on the lower slopes of Mount Waterloo on the Prince Regent River.

Before leaving Careening Bay in 1820, crew members lit a patch of unburnt bush on the side of the hills surrounding their campsite. Cunningham expressed surprise at how rapidly the fire spread, consuming all the vegetation in its path and demonstrating how severe fires could be at the end of the dry season. He observed 'that small smokes that may ascend still be no indication of the

presence of natives on the spots where they arose, since we have observed stumps of *Eucalyptus* have continued burning many days, frequently lighting up to a blaze, if fanned by wind in the night'.

As they prepared to leave, the boats were sent ashore to replenish the water supply and retrieve a quantity of firewood that had been left ready cut on the beach. By 8 October, everything was on board and King made preparations to depart Careening Bay.

After leaving, he wrote: 'Our people were now all laid up with sores upon their feet and legs, from cuts and bruises received in scrambling over the rocks; and several were affected by ophthalmia.' He then made the decision that, as the wet season was rapidly approaching and the *Mermaid* was still leaking badly, it was time to quit the Kimberley coast and return to Port Jackson. His journal read: 'it was with great regret that I found it necessary to resolve so; for the land to the westward appeared so indented, as to render the necessity of our departure at this moment particularly vexatious.'

At sunset on 9 December 1820 the *Mermaid* entered the Heads of Port Jackson, and King secured his vessel at the King's moorings in Sydney Cove, having successfully completed his Third Surveying Expedition. He wrote that the voyage from Careening Bay had been undertaken within the 'pale of danger', for death had been their constant companion.

ANPS publications available

Australian Native Plants Society publications from 1990 including '*Australian Plants*' are available and free to interested ASBS members. For further information please contact Roger at rjhnatiuk@yahoo.com.au.

Retirements at CANB

Brendan Lepschi CANB

Needless to say, 2020 proved to be an eventful year, and amidst the catastrophic bushfires, hailstorms and pandemics, the Australian National Herbarium (CANB) also experienced two other significant events, namely the retirement of two long-standing and much loved staff members, Jo Palmer and Andrew Slee. Jo retired in December 2020 after 38 years with CANB, while Andrew retired in April 2020 after a remarkable 47 years with CSIRO in Canberra, the last 31 of which were spent at CANB.

To mark these significant changes, both Andrew and Jo have kindly provided some notes on their time at CANB. It should be noted that while both have retired, neither have departed, with both Andrew and Jo remaining with CANB as affiliates, Andrew working on updating content for the interactive Lucid identification key *EUCLID*, as well as continuing to curate CANB's extensive eucalypt collection, and Jo working on various taxonomic projects in the Amaranthaceae as well as dealing with selected backlog donations. Some things (thankfully) never change, at least in herbaria!

Jo Palmer

38 years at the herbarium – the 1980s
[transcript of notes from Jo's speech at her retirement celebration]

The herbarium has been a great place to work for 38 years, with the most wonderful people and many long friendships. I have four pages of dot points for all those years but I will just talk about the 1980s as that is where it all began!

In January 1982 I had almost completed a Bachelor of Applied Science in Ecology at what is now Canberra University. I was at home in Gosford north of Sydney for the holidays, when my now husband, Chris sent me a tiny job advertisement from the Canberra

Times. It was for a 'Technical assistant' at CSIRO, with the duties described as 'Laboratory assistance associated with a plant biology program'. After a successful interview here on the CSIRO Black Mountain site I started at the herbarium on the 5th March 1982. The position was part-time for two years, working in the building now occupied by the Australian Tree Seed Centre, mounting herbarium specimens. I am forever grateful to the [then CANB] Curator Bryan Barlow for taking me on.

Greg Whitbread taught me how to mount the specimens using a wine cask contraption to dispense the glue – quite ingenious! The mounting process - glue the specimen to an archival sheet of card, add a sheet of plastic, write up a flimsy/folder with the collector and plant name details, place the card and plastic in the folder and make a pile, then place a carboard on top of the pile and weigh down with a sandbag to dry overnight. The plastic was then removed and the mounted specimens were boxed, put in a chest freezer, frozen for a week and then driven up the hill to the herbarium.

This 'keen young ecologist' realised pretty quickly that the herbarium was an incredibly interesting place to work. Research scientists such as Max Gray, co-author of the *Flora of the ACT* and the *Kosciusko Alpine Flora*, and Malcolm Gill, author of *Fire and the Australian Biota*, both references used at uni, were actually staff here on site! There were no animals to mark and recapture or kill and skin, or insects to kill and pin. Just plant specimens from all over the world that needed mounting, sorting into families and putting away in a particular order. It was a great way to learn families and the flora. When a fulltime position became available for three years, I jumped at the opportunity which then luckily for me became indefinite ... who would have thought I would still be here today!



Left Jo Palmer, with research interest *Gomphrena cunninghamii* (Amaranthaceae), Rudall River area, Western Australia, 2011. Image: Chris Marshall

As well as the general herbarium duties of specimen mounting and incorporation under the kindly, watchful eye of Lei McGregor, the Collection Manager at the time, I also provided technical assistance to Lyn Craven by growing plants of *Heliotropium* and *Hibiscus* from seed, for projects that he was working on. Lyn also taught me the merits of a good herbarium specimen as we pressed many of these plants for the herbarium collection. One particular c. 2m tall *Hibiscus* that I was let loose on comes to mind: I think it ended up as 12 sheets and I was very proud of my efforts. The other research scientists – Bryan Barlow (Loranthaceae and Myrtaceae), Max Gray (Asteraceae), Tom Hartley (Rutaceae and *Syzygium*), Andrew Kanis (Amaranthaceae and non-*Acacia* Mimosaceae), Mike Lazarides (Poaceae), Judy West (Sapindaceae, Portulacaceae and Caryophyllaceae), and the retired Curator, Hansjoerg Eichler (Zygophyllaceae and Ranunculaceae) were all very supportive and I learnt so much. It was an honour to work with them. In those days Lei looked after the tea breaks as well as the collection – she would make the tea in a big pot in what is now the CANB Mounting Room and the tea room was across the corridor in the room now used as part of our specimen imaging program. When the tea was ready, Lei would ring the bell at the bottom of stairs

and we would all troop down for a cuppa and a chat. Such a friendly atmosphere, I loved it!

The first PC in the herbarium lived in what is now the CANB QAP (Quarantine Approved Premises) and we had to book a timeslot to use it. To print, one had to wrestle with the Datamax printer that used wide or narrow format ‘hole guided’ paper and it was always a bit of a challenge. In 1986 we started databasing the specimen label information from selected groups, and ANHSIR (the Australian National Herbarium Specimen Information Register) was born. It was so cool to be able to query all the label information in the database for a particular field and print out a list of information rather than laboriously hand writing or typing a list on a typewriter. Also, in 1986, CHAH ran the first Herbarium Technicians Workshop. It was held in Brisbane and Cathy Miller, Kirsten Cowley and I attended. Alex George gave a very enthusiastic presentation about the *Flora of Australia* project which proved to be very good for us. Back in Canberra, Bryan encouraged us to begin curating some of the families in the collection using various recently published journal revisions and also treatments from the *Flora of Australia* volumes, which was very rewarding. When Andrew Kanis sadly passed away later that year Cathy and I enthusiastically took on

writing flora treatments for the small genera of Amaranthaceae that Andrew hadn't yet managed to complete.

Another skill gained at that time was using the Scanning Electron Microscope on site to take images of leaf surfaces for Bryan and Max and seeds for genomics researcher Tony Brown. The detail was extraordinary. In 1987 the CSIRO Forestry herbarium (FRI) was moved from Yarralumla to a demountable behind the CSIRO Library on Black Mountain. The specimens were mostly *Eucalyptus* with some *Acacia* and Casuarinaceae. Eucalypt expert Ian Brooker also joined the herbarium team. I remember helping Lyn, Laurie Adams and Greg shift the collection using a big caged truck from the CSIRO Plant Industry Store. That truck would come in very handy again in 1994 when the CBG herbarium was moved to the CSIRO site.

In 1988-1989 'Grasses of the World' expert, Derek Clayton was a Visiting Scientist at the herbarium. I assisted Mike Lazarides and Derek with coding various grass genera, including *Eragrostis*, into DELTA format to produce detailed plant descriptions and interactive keys – it was all very new and innovative at the time. I would later go on to edit Mike's *Eragrostis* revision for the *Flora of Australia* project. Over that same period, I assisted Mike on a contract funded by the Australian National Parks and Wildlife Service to collect plant specimens in Uluru National Park and set up an herbarium at the Park Headquarters. 1988 was a bumper season and during the field trips in May and August, we were able to collect representatives of most of the flora known to occur there and also many previously unrecorded taxa. Mike was a great teacher when it came to plant collecting in the field and it was a wonderful experience for me.

In between all the research assistance and general curatorial work Bryan was keen to promote the work of the herbarium and related research groups. So began the many displays for Heritage Week, Science Week, Site Open Days and herbarium tours which

still happen to this day. The historical Banks and Solander specimens were a display favourite, and I remember spending many hours putting that original display together, all hand done as there were no printed posters back then. By the late 1980s the herbarium building had run out of space for specimens and part of Building 65 (the now Australian Tree Seed Centre building) was taken over as temporary expansion. Most of the monocots and all the gymnosperms, ferns, cryptogams and the ever-increasing backlog of exchange were housed there. We had many fun 'working bees' sorting exchange into families so that the specimens were more accessible.

That is just the 1980s! There is so much else to talk about but I will leave it for another time. The herbarium is an amazing place and I feel very privileged to have worked here.

Andrew Sleec

[notes provided by Andrew to Brendan Lepschi]

I studied Botany and Zoology at Monash University part time from 1968 to 1972 while working at the Victorian Department of Agriculture's Vegetable Breeding Group. I didn't like being a student much. In late 1972 I was interviewed by Richard Groves of CSIRO Plant Industry's Ecology Unit for a technical assistant position in field ecology, especially with respect to fire and grazing. I started work on 3 January 1973, working in the sub-alpine zone mainly at Kiandra, NSW and in the semi-arid zone at Yathong, NSW. When the Ecology Unit folded in 1988 due to retirements and lack of financial support, the then director of the Australian National Herbarium, Bryan Barlow, employed me in the CANB collection as a pair of hands entering specimen label data into the very first herbarium database. At about this time, 1989, Ian Brooker, then of CSIRO Forest Research in Perth, came back east and joined the Herbarium staff as a eucalypt botanist. I spent the next 11 years working with Ian until his retirement.



Above Andrew Slee, 2020. Photo by Zoe Slee.

My first eucalypt field trip was to collect seed of *Eucalyptus eximia* across its range from Danjerra, near Nowra, north to the Broken Back Range near Broke. Three things were notable about this trip: I did the trip solo, at my own pace; trees were sampled across the species geographic range; the seed collected was used to grow seedlings for comparison of seedling morphology. This set a pattern for working on the eucalypts for the rest of my employed time at CSIRO. Collect data in the field, herbarium and glasshouse, with these data ultimately contributing to the *EUCLID* identification key. Unfortunately, OHS regulations meant no more solo field trips, though I did manage a three-week solo trip in 1999 to the centre of eucalypt diversity in the south west of WA – a memorable time. Other significant projects included the incorporation of several large collections into CANB, beginning with the FRI Herbarium (formerly part of the now defunct CSIRO Division of Forestry in Canberra) eucalypt collection: 65,000 specimens incorporated following Ian Brooker's phylogenetic classification. This was followed by the Dennis

and Maisie Carr collection from the Research School of Biological Studies at the Australian National University (perhaps the worst job at CANB, although that wasn't so bad once I developed familiarity with Maisie's handwriting and notebook style), and eucalypts from the former herbarium of the NSW Soil Conservation Service at Condobolin. I've enjoyed working with the CANB eucalypt collection which now includes these and other collections. Collections are a treasure after all, and like treasure the collection needs continual looking after which means jobs for people.

Another major project was the construction and testing of the interactive key "*EUCLID: eucalypts of Australia*", thankfully strongly based on field studies. Colleagues on this project were Ian, John Connors and Siobhan Duffy with Judy West as project manager. Because of this project I've seen a lot of eucalypts where they naturally occur, but unfortunately not quite all of them. *EUCLID* was published in 2006, and since then we have published, with Identic Pty Ltd, an updated online edition, and also an app, in April 2020, with taxonomy up to date to July 2019.

With the completion of the *EUCLID* app and the finishing of Carr & Carr specimen processing (except for a few seed packets) I was happy to retire, and I like the connection to the herbarium I still have as an Honorary Research Fellow. Since 2008 I have only been able to continue work at all with the love and support of partner and now carer Jen Johnston. CSIRO and the Herbarium have been flexible and very helpful in the workplace as I adapted to this strange new life.

Updating AK's collections filing systems following APGIV

Yumiko Baba Associate Curator, Auckland War Memorial Museum Herbarium
Dhahara Ranatunga Collection Manager, Auckland War Memorial Museum Herbarium

The botanical collections of the Auckland Museum Herbarium (AK) were first established in the 1870s. It coincided with Thomas F. Cheeseman becoming the first director and his main interest was botany. Cheeseman was an avid collector, travelling across the country by train and on horseback, and accumulating over 10,000 botanical specimens during his lifetime (Goulding, 1996). With the death of Thomas Kirk in 1898, Cheeseman was commissioned to continue compiling a Flora of New Zealand, which he completed in 1906 (Cheeseman 1906). For this, he received a duplicate set of New Zealand specimens from the British Museum (BM) that Banks and Solander collected during Cook's first voyage. Cheeseman was actively involved with exchanging herbarium specimens with foreign botanical institutions, which contributed to the diversity of the AK collections. The herbarium now houses about 400,000 specimens, of Alga, Lichens, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms, built upon the firm foundations Cheeseman laid during his 50 years as director.

Like many herbaria worldwide, the AK herbarium uses the linear filing system following family-level evolution. AK has been updating the classification systems for Pteridophyte & Lycophytes and Angiosperms in stages since 2017. In this article, we report on the recent Angiosperm family update we have undertaken and completed.

The last filing system that the herbarium used was established in the 1980s based on an evolutionary hypothesis derived from morphological characters only (most likely one of Cronquist's systems). The new ground-breaking classification system, Angiosperm Phylogeny Group (APG; 1998), was first proposed with the increasing knowledge

of molecular evolution in the late 1990s. Since then we have modified part of the collections to reflect the evolutionary history of some families derived from more recent research, though this made the AK's filing system inconsistent and somewhat confusing.

The 4th generation of APG (2016) provided a more robust and stable linear system that gave us the confidence to update our filing systems in the herbarium.

The nationwide lockdown due to the COVID-19 pandemic in New Zealand in 2020 gave the botany team a chance to check data-based names in the collections and to work through the new family circumscriptions re-



Top Specimen boxes were temporarily emptied from the shelves, and were temporarily relocated to the library and office space (**bottom**)



Top Zara Skuse shuffles specimen boxes under the watchful eyes of Cheeseman. **Middle** Ricky-Lee Erickson aligns specimen boxes, and Dhahara Ranatunga checks labels ready to be relocated back into the shelf space. **Bottom** Dhahara Ranatunga relocates specimen boxes to the new shelf space.

quired to adopt in our system. Subsequently, in the second half of 2020 and the first half of 2021, we allocated new numbers for the families recognised in the APG IV system, re-labelled our collections boxes, and shuffled the boxes to follow this new system.

During this process, 7,150 specimen boxes containing 161,000 specimen sheets were relocated to new shelf locations. Accomplish-

ing this feat required one Senior Collection Manager, two Natural Science Technicians, two part-time technicians specifically hired for the project, two intern students and many botany volunteers who gave us support in various tasks throughout the project; all things considered, it was a massive team effort, one that can usually only be dreamed of!

After the successful mental and physical gymnastics the AK vascular plant collections (except Gymnosperms) are finally aligned with the most up-to-date filing system, which follows the evolutionary history of angiosperms as one walks through the collections from one end to the other!

Acknowledgements

We would like to express sincere appreciation and gratitude to the following people for their time and support: Rebecca Bray, Janice Butcher, Ewen Cameron, Frances Duff, Shelley Heiss-Dunlop, Ricky-Lee Erickson, Eva Fernández, Darryl Jeffries, Mia Maihi, Helen Preston Jones, Ella Rawcliffe, Zara Skuse and Josh Salter. Photographs are credited to Jennifer Carol.

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An update on the Foreign Collection Project at MEL

Rebecca Le Get, Rita Macheda, Eugenia Pacitti and Luke Vaughan

Royal Botanic Gardens Victoria

Introduction

In the June 2019 issue of the *ASBS Newsletter*, Rita Macheda and Luke Vaughan gave an overview of the Foreign Collection Project at the National Herbarium of Victoria (MEL), Royal Botanic Gardens Victoria (RBGV). Here, we provide an update on how the project is progressing, describe the geographic breadth of the collection, and highlight two collectors whose contributions to MEL's global collection demonstrate the diversity of the herbarium's holdings across space and time.

The Foreign Collection Project is part of the long-term databasing work undertaken at MEL. With most of the Australian material now databased, attention has turned in recent years to cataloguing the significant non-Australian component of the collection. Now in its eighth year, the Foreign Collection Project team has databased 86,650 specimens, including 6,796 type specimens. Since our last update in June 2019, we have databased 38,951 specimens from 215 families, across 184 countries in six continents (Figure 1). Some of the larger families completed in that time include Fabaceae, Boraginaceae and Cistaceae. We have also added 981 collectors to our collection management system.

The project currently has four Database

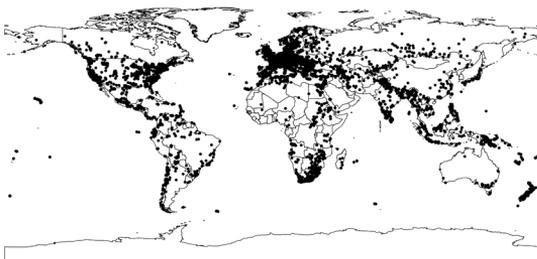


Figure 1 Since June 2019, almost 40,000 plant specimen records from MEL's global collection have been catalogued.

Officers working through material in the global collection. Rebecca Le Get and Eugenia Pacitti joined the project in 2020 after two project staff took up roles curating specimens in preparation for digitisation. Rebecca and Eugenia bring new skills and specialised historical knowledge to the team, complementing Luke's botanical skills and Rita's expertise in databasing and library science.

Rebecca and Eugenia commenced in February and July of 2020, each starting just before one of the major lockdowns in Victoria. Databasing – and in some cases learning the job – while working from home was a major achievement. Each specimen and label needed to be photographed and uploaded to the cloud to access from home. The permitted one day each week in the Herbarium was taken up with curation, problem solving and photographing specimens for the next week's work. The ability to do this work from home was greatly facilitated by RBGV's timely adoption of Microsoft Teams in 2019, which allowed the Database Officers to easily confer on label translations and other queries, and MEL's use of the web interface for the Specify collections management system alongside the desktop version.

Geographic breadth of the collection

Although unable to travel for much of the last two years due to the pandemic, georeferencing specimens from MEL's global collection has allowed the Database Officers to travel vicariously to all reaches of the globe.

Specimens from the global collection took the Database Officers on virtual adventures, from Isla Hornos, a small island at the end of the Tierra del Fuego archipelago where Joseph Hooker collected during the Ross Expedition, to Lake Baikal in eastern Siberia, where Nikolai Turczaninow collected speci-

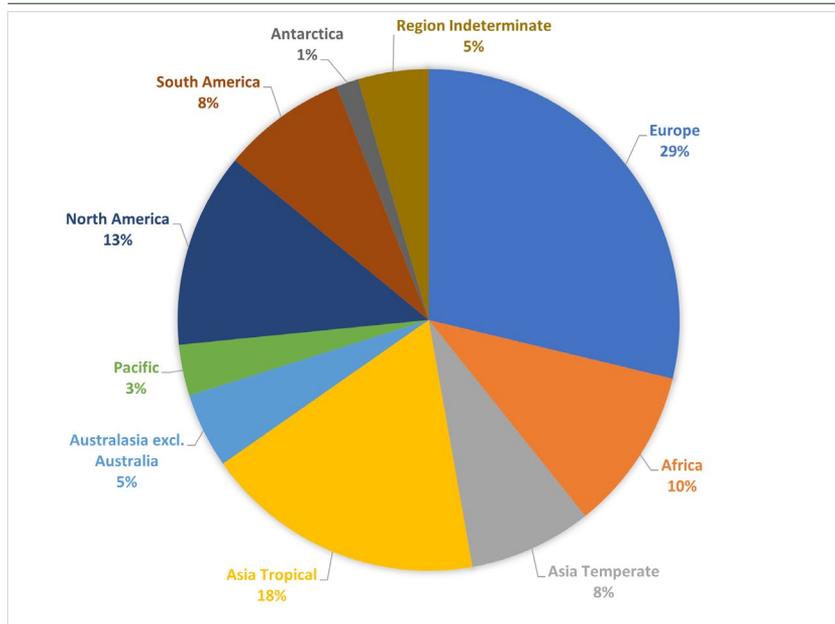


Figure 2 The proportion of specimens from each geographic region (following Brummitt et al. 2001) among catalogued specimens in MEL's global collection, excluding specimens collected in Australia.

mens of *Silene*.

Through careful transcription, the team are building an increasingly detailed picture of the geographic scope of MEL's holdings, and key collectors in each region. Figure 2 shows the proportion of specimens in MEL's global collection from each major geographic region; despite an expected bias towards specimens from Europe, all continents are well-represented. Figure 3 lists the top five contributors to MEL's global collection from each region based on the specimens catalogued to date.

Connecting with collectors

Despite the taxonomic and geographic scope of MEL's global collection, the extent of this remarkable collection is still relatively unknown by the wider botanical community. As well as cataloguing the specimens, the FCP team have been busy promoting knowledge of the global collection through highlighting specimens and collectors in social media posts, and by creating and editing Wikipedia articles about people represented in the collection.

During the pandemic, while the team frequently worked from home, we connected with certain collectors whose stories offer insights into the curiosity and commitment that have helped build vast repositories of botanical knowledge around the world. Two collectors who have intrigued and delighted

us during this time are Maarten Buysman and Alice Eastwood.

Maarten Buysman

As the global collection continues to be databased, the role of colonial scientific networks in the collection and dissemination of plant specimens is being better understood.

In 1893, Ferdinand von Mueller received approximately 70 mounted specimens of "dried medicinal plants" from the Dutch gardener Maarten Buysman (1856–1919), which were then exhibited at a Field Naturalists Club of Victoria meeting (Anon. 1893).

Although biographical details are scarce, Buysman managed a garden in Middelburg, named the *Hortus Plantarum Diaphoricum*, in the late nineteenth century where he cultivated plants to prepare and sell as herbarium specimens (Backer 1928). He apparently intended to expand the gardens as his business grew, but it is unclear if these plans ever came to fruition (Buysman 1890). By the early 1900s he had relocated to Java in the Dutch East Indies, and established an experimental garden in Lawang, with the intention of repeating the success of his Middelburg garden, which never eventuated (Backer 1928).

To date, only nine of the 70 Buysman specimens have been databased, including a

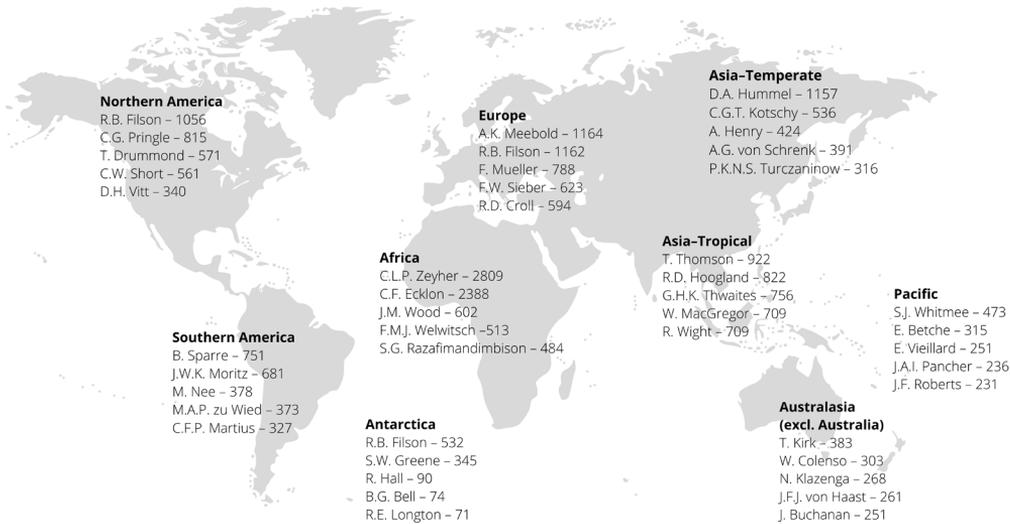


Figure 3 The five most prolific collectors in MEL's global collection per region, based on specimens catalogued to date.

cultivated specimen of *Ammobium alatum* R.Br. (MEL 2155711, Figure 4). In researching the provenance of these specimens, it became apparent that Buysman managed a sophisticated business where plants were sourced from a global network of collectors, including in the Dutch East Indies and Australia, that he grew in the Netherlands (AVH 2021; Buysman 1890). He would then harvest plant material to sell as pre-prepared herbarium sheets, including floral parts preserved in small glass vials in alcohol, as part of a subscription service (Steenis-Kruseman & Steenis 1950). Much to our delight, although the alcohol has since evaporated, the glass vials are often still extant and have remained with the rest of their herbarium sheet (Figure 5).

Due to Buysman's labels emphasising that many of his specimens were cultivated, they obscure who had made the original collections. By sourcing the advertisements Buysman placed in multiple botanical magazines in the late nineteenth century, however, the scale of his network of collectors became clear, even if the individual labour of those collectors is still unknown.

Alice Eastwood

Our research into the stories of collectors represented in the Global Collection has also brought to light intriguing individuals who have made significant contributions to our knowledge of herbarium curatorial con-



Figure 4 MEL 2155711, a specimen of *Ammobium alatum* R.Br. cultivated by Maarten Buysman in Middelburg, Netherlands, from Australian plant material



Figure 5 Glass bottle with wooden stopper, found in situ with MEL 2155711, originally prepared by Maarten Buysman. State Botanical Collection, RB MSS 759.

ventions, yet remain relatively unknown in Australasia.

As a collector in remote parts of the western United States, Director of the California Academy of Sciences, and champion of herbarium curatorial conventions, Alice Eastwood (1859–1953) has left her mark on the history of plant collecting and botanical collections management (Figs 6 & 7).

During her tenure as Director of the California Academy of Sciences, Eastwood travelled through remote areas of the western United States, made collections of and named many new species endemic to the region, including *Potentilla hickmanii* and *Polemonium californicum* (Wilson 1953).

When San Francisco was hit by a major earthquake in 1906, the Academy's building was heavily damaged. Fire broke out, and the entire collection was under threat. Eastwood sprang into action to try to save what she could. Using an improvised rope pulley system and wooden carts, she managed to save over 1,200 specimens, including many irreplaceable type specimens (Eastwood in Anon. 1906). It was not mere luck, however, that enabled Eastwood to salvage these specimens. She had devised a storage system not regularly used in her time, wherein type specimens were held separately to the rest of the material (Eastwood in Anon. 1906). Her foresight meant she could quickly locate the type material and take it to safety, a curatorial practice now seen in many herbaria.



Figure 6 (top) Alice Eastwood (1859–1953) in c. 1910

Figure 7 (bottom) MEL 2401625, a specimen of *Eschscholzia californica* Cham. collected by Alice Eastwood in San Francisco in 1894

Despite Eastwood's efforts, the Academy lost most of its collection to the fire. Not one to lose heart, Eastwood spent the rest of her career collecting and exchanging specimens to replenish the Academy's collection. Her devotion to the cause saw the collection grow to over 340,000 specimens – more than three times the amount lost to the fire in 1906. She also developed relationships with other herbaria around the world and developed the Academy's library (Howell 1954).

Each of Eastwood's collections we database is a reminder of not just an intrepid collector, but of a woman who shaped the way herbaria store and care for botanical material. Her dedication to developing herbarium curatorial standards provides inspiration to our own work to preserve the Global Collection for future researchers.

Looking forward

The Foreign Collection Project is just one part of the overall objective to digitise the entirety of the collection at MEL. Working in conjunction with the Global Plants Initiative (GPI) and the Preparing for Digitisation Project, an inhouse project to mount specimens from the global collection, MEL has now databased 27% of the approximately 500,000 specimens collected from outside of Australia that the National Herbarium of Victoria holds.

Working with our colleagues, the overall aim of the Foreign Collection Project and the Preparing for Digitisation Project is to have all the specimens mounted, databased with accurate transcriptions, and finally photographed so that our collections can be viewed from anywhere in the world. In making our collections accessible, we hope they will become a valuable resource for researchers across multiple fields, who may otherwise be unaware of or unable to access our holdings.

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Cooper's botanical art opening

Lizzy Joyce Australian Tropical Herbarium, James Cook University

On the 27th of August, the Cairns Art Gallery celebrated the opening of *William T Cooper: Botanical art of the tropical rainforest*. Bill Cooper was most famous for his bird illustrations, having been described by Sir David Attenborough as the 'world's greatest living wildlife illustrator'; however, he was also a brilliant botanical illustrator. ASBS members will probably be most familiar with his illustrations in *Fruits of the Australian Tropical Rainforest* – which, together with Wendy Cooper's expert taxonomic descriptions – make it one of the most indispensable (and beautiful) reference books on Australian rainforest plants. The exhibition, organised by Wendy and Cairns Art Gallery brought together works from all over Australia, many from private collections that haven't been displayed in public before, and also featured herbarium specimens from the Australian Tropical Herbarium (CNS) relevant to the works. The opening night of the exhibition was attended

by many CNS staff, and we had a fabulous night poring over the artwork on show, agog at the skill, detail and beauty of the works. I particularly enjoyed the parts of the exhibition where quick line studies were displayed next to the finished, detailed watercolour or oil paintings. Here, you could see where Bill had transposed or flipped parts of the plant to enhance the composition of the final work, but without compromising the accuracy of the plant's depiction – something that can only be done by someone with a strong understanding of plant form and anatomy and an appreciation for scientific accuracy. The exhibition has been extended until the 13th of February, 2022 and is accompanied by botanical tours, botanical illustration courses and talks (including one from CNS Curator Frank Zich!). Hopefully the extension means that our fellow members from interstate can catch it when lockdowns ease – it's a wonderful exhibition not to be missed!



Above The CNS gang at the opening of *William T Cooper: Botanical art of the tropical rainforest*. **Back row, L-R** Golo Maurer (BirdLife Australia), Robyn Fortune (CNS), Wendy Cooper (CNS), Eda Addicott (CNS), Frank Zich (CNS). **Front row, L-R** Lars Nauheimer (CNS), Lizzy Joyce (CNS), Stu Worboys (CNS), Daniel Montesinos (CNS).

Estelle Margaret Canning

2 December 1936 – 30 June 2021

Murray Fagg Australian National Botanic Gardens, Canberra



Above Estelle Canning, 1998. Photo by M.Fagg, ANBG.

Estelle grew up in Wangaratta in northern Victoria, one of five children of Walter and Olive Canning; her father was an accountant. After completing her secondary education in Wangaratta she won a scholarship to Melbourne Teachers College and then taught English Literature and History, at various high-schools around Victoria. She then taught at Malabunga High School near Rabaul in Papua New Guinea for three years, where she also learnt to drive.

On her return from PNG she decided to indulge one of her great passions by going to England and studying singing at Covent Garden while earning a living as a barmaid. Returning to Australia she pursued her second passion, Australian plants, by enroll-

ing for a Science degree majoring in Botany at Melbourne University.

In early 1966 she had a vacation job with the then Canberra Botanic Gardens working for Dr Betty Phillips collecting alpine plants around Happy Jack's Plain in the Kosciuszko National Park. Around September 1967 she commenced work as a botanist with the Canberra Botanic Gardens. Her work as a 'Junior Botanist Class 1' was mainly concerned with field-collecting, usually accompanied by a horticulturist who collected living propagation material, and the subsequent identification of plant specimens in the Gardens' Herbarium (CBG). Estelle was fortunate to be included in the Gardens' second major collecting trip to Western Australia, starting in August 1968 for a period of three months. Two vehicles were involved with botanical and horticultural staff rotating back and forth to Canberra by plane. Estelle collected nearly 3,000 specimens on that trip. She was very involved with getting plant name labels out into the Canberra Botanic Gardens for its official opening in October 1970, as at that time the physical labelling and stocktake of the living collection was the responsibility of the Herbarium. During the 1970s she enrolled in an external MSc with Melbourne University on leaf anatomy in the genus *Acacia*. She was instrumental in developing the Public Reference Herbarium at the Gardens and was later involved with producing several Environmental Impact Statements for various projects in local government areas near Canberra. Estelle continued to be actively involved with field-collecting until the early 1990s, and by the time of her retirement in September 1995 she had collected about 10,500 specimens.

During her working life she had seen the Botanic Gardens' Herbarium moved to a new purpose-built building in 1974, and later



Above Estelle Canning pressing specimens at the back of the 4WD Jeep Wagoneer in Ceduna, SA, on the way from Canberra to WA in 1968. Photo by M.E.Phillips, ANBG.

Left Estelle Canning writing up field-book in the yard of a hotel in Coolgardie, WA, on the 1968 Canberra Botanic Gardens field trip. Photo by M.E.Phillips, ANBG.

merged with the CSIRO Herbarium (CANB) as the Australian National Herbarium with most of the collection moved from the Gardens to a building on CSIRO's Black Mountain site in 1994.

After retirement in 1995, Estelle continued as a volunteer with the Australian National Herbarium for several years, but her other interests soon took over. In 1985 she had bought her beloved Kunama Cottage property, near Dalton, a small village between Goulburn and Yass in NSW. There she had a flock of 'coloured' sheep and processed their wool, spinning, dyeing and knitting. She was respected and renowned for using native plants for dyeing and won many prizes at the Canberra Show. Estelle was also a founding member of the Canberra Recorder and Early Music Society, playing recorder and teaching Renaissance dance. She was a long time member of the Canberra Spinners and Weavers as well as a member of the Dalton Craft Group, Yass Spinners and Weavers, the

Yass Choir, and the Local Bush Fire Brigade and various other groups in and around Canberra.

Estelle died at the age of 84 at Kunama Cottage on 30 June 2021 and her funeral was attended by a wide range of people from her various hobby interests and her botanical career on 14 July. Unfortunately, due to COVID-19 restrictions her family members could not attend.

News

Todd McLay & Lizzy Joyce



One in a MELLion

The Age has featured the National Herbarium of Victoria to celebrate the cataloguing its millionth specimen *Irenepharsus magicus*

<https://www.theage.com.au/national/victoria/floral-time-capsules-herbarium-logs-its-ellusive-millionth-specimen-20210722-p58byw.html>

Photo: Rita Macheda & Andre Messina with the millionth specimen by The Age

Online and in the media

The Sartorial Naturalist

A new film by Tasmanian botanical artist Deborah Wace explores how she incorporates plant imagery, including herbarium specimens into her multi-media art and design

Link to story: <https://www.abc.net.au/news/2021-07-16/the-sartorial-naturalist-tasmanian-endangered-plants/100297414>



Fungi fancier find

A fungi enthusiast on the Gold Coast has stumbled across a new species of greenhood orchid in Lamington National Park

Link to story: <https://www.abc.net.au/news/2021-07-28/new-orchid-species-discovered-in-gold-coast-hinterland/100322870>

Metabarcoding buzz

CSIRO scientists are using metabarcoding to determine the provenance of Australian honey

Link to story: <https://www.canberratimes.com.au/story/7290445/scientists-abuzz-with-honey-dna-testing/>

On *that* *Acacia* debate...

A great summary article by ABC Science on why Australia got to keep the name *Acacia*

Link to story: <https://www.abc.net.au/news/science/2021-06-20/acacia-name-debate-botany-taxonomy-africa-australia-plants/100221938>

WTMA winners

The Tropical Mountain Plant Science Collaboration has been awarded the Wet Tropics Management Authority's (WTMA) Cassowary Award for Climate Change Leadership. The project includes collaborators from herbaria, seed bank organisations, botanic gardens, traditional owners from across the country and the Queensland Parks and Wildlife Service, and is managed by Stuart Worboys (pictured right) from the Australian Tropical Herbarium (CNS).

Link to story: <https://www.tropiconow.com.au/2021/june/21/local-leaders-awarded-for-wet-tropics-conservation-projects>

Photo: Stuart Worboys (right) from CNS receiving the Cassowary award



Papers and publications

Should we use herbarium specimens for climate change research?

An interesting study looking at whether herbarium specimens have changed during the past centuries and whether these changes were due to shifts in plant collection practices or climate change.

Link to paper: Kozlov *et al.* (2021) *Annals of Botany* <https://academic.oup.com/aob/article/127/7/865/6131369>

Go for green (herbarium specimens)

This handy paper has quantified what we all thought we knew from experience: when it comes to sampling herbarium specimens for target capture sequencing, the greener (and younger) the specimen, the better the data.

Link to paper: Kates *et al.* (2021) *Frontiers in Plant Science* <https://www.frontiersin.org/articles/10.3389/fpls.2021.669064/full>

What-the bottleneck?

A new paper has found that despite the prevalence of genetic bottlenecks in invasive populations, invasive *Acacias* have a similar level of genetic diversity to native populations, and no evidence of historical bottlenecks.

Link to paper: Vicente *et al.* (2021) *Annals of Botany* <https://academic.oup.com/aob/article/128/2/149/6238621>

ASBS student and ECR register

In order to promote the connectivity and visibility of our students and early career researchers (ECRs) in ASBS, ASBS Newsletter publishes a student and ECR register. If you're a student or ECR and would like to opt-in to this register follow this link: <https://forms.gle/wxSzGA9F-pBTNXB6j8>. For any questions or to change your details, contact Lizzy at editor.asbsnews@gmail.com

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The newsletter

The ASBS newsletter keeps members informed of society events and news, and provides a platform for debate and discussion. The newsletter is published quarterly on the ASBS website and in print. Original articles, notes and letters (not exceeding ten published pages in length) are encouraged for submission by ASBS members.

Have an article or an idea for the newsletter?
Send it to Lizzy at
editor.asbsnews@gmail.com

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Full page: \$200
Half page: \$100
Flyers: \$250

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The society

The Australasian Systematic Botany Society is an incorporated association of over 300 people with professional or amateur interest in botany. The aim of the society is to promote the study of plant systematics.

Membership is open to all interested in plant systematics. Members are entitled to attend general and chapter meetings, and to receive the *ASBS Newsletter*. Any person may apply for membership by filling in a membership application form available at <http://www.asbs.org.au/membership.html>, and forwarding it to the Treasurer. Subscriptions become due on 1 January each year.

The ASBS annual membership subscription is AUD \$45, and a concessional rate of AUD \$25 is offered to full-time students, retirees and unemployed people. Payment may be by credit card or by cheque made out to Australasian Systematic Botany Society Inc., and remitted to the Treasurer. All changes of address should be sent directly to the Treasurer as well.

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