



Newsletter

Australasian Systematic Botany Society

No. 199, June 2024



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Australasian Systematic Botany Society
Incorporated Council

Council President

Katharina Nargar
Australian Tropical Herbarium, JCU
PO Box 6811,
Cairns QLD 4870, Australia
(+617)/(07) 4232 1686
president.asbs@gmail.com

Vice President

John Clarkson
QLD Dept. of Environment and Science
PO Box 975
Atherton QLD 4883, Australia
(+61) 437 732 487
vicepres.asbs@gmail.com

Secretary

Tim Collins
Climate Change Energy the Environment
and Water
11 Farrer Place
Queanbeyan NSW 2620
(+61) 458 857 877
secretary.asbs@gmail.com

Treasurer

Mike Bayly
The University of Melbourne
Parkville VIC 3010, Australia
(+613)/(03) 8344 5055
treasurer.asbs@gmail.com

Councillor

Kerry Ford
Allan Herbarium
Manaaki-Whenua Landcare Research
PO Box 69040
Lincoln 7640, New Zealand
councillor2.asbs@gmail.com

Councillor

Lalita Simpson
Australian Tropical Herbarium, JCU
PO Box 6811,
Cairns QLD 4870, Australia
councillor1.asbs@gmail.com

ASBS Research Committee

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Benjamin Anderson, Janet Gagul,
Peter Heenan, Sarah Mathews, Jennifer Tate

Public Officer

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Jen Tate, Peter Weston, Peter Wilson

Webmasters

Anna Monro
Kelly Shepherd
webmaster.asbs@gmail.com

Facebook Group Administrator

Mike Bayly mbayly@unimelb.edu.au

ASBS Newsletter Editorial Team

Editor

John Clarkson editor.asbsnews@gmail.com

Production editor

Kelly Shepherd

Section Editor — News

Todd McLay todd.mclay@gmail.com

Section Editor — Book reviews

John Clarkson John.Clarkson@des.qld.gov.au

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From the President

Katharina Nargar

This year is a big conference year for our botanical community with the XX International Botanical Congress (IBC) being held in Madrid in July. It is wonderful to see that so many ASBS members will be attending and contributing to the conference program through presentations, symposium organisation, and/or by taking part in the nomenclatural sessions. I am particularly excited for our ASBS students and ECRs for whom this will be the first IBC conference. As such large international conferences can be somewhat daunting, the ASBS student and Early Researcher (SECR) subcommittee is planning some networking activities at the IBC to make this first international conference a truly enjoyable experience for our ASBS students and ECRs. Many thanks to Helen Kennedy, Andrew McDougall, Patrick Fahey, and Paul Baleeiro for organising this.

This brings me to an update regarding the next ASBS conference. Council had been in contact and negotiations with potential hosts for the next ASBS conference. However, given that many of us have already made commitments to attend the IBC in Madrid this year, the overall consensus was to defer the ASBS conference to next year. Council and the SECR subcommittee are currently exploring the possibility of an ASBS SECR conference, similar to the one held in Sydney in 2022, for later this year or early 2025.

The Hansjörg Eichler research grant March round has now been completed and I am delighted to announce the successful applicants: Tara Evans (PhD candidate, University of Adelaide), Rihad Hossen (PhD candidate, University of Melbourne) and Charlotte Nelson (Honours student, University of Western Australia). I am particularly pleased that ASBS was able to support three student projects in this round with a little top up of the available funds granted by our Treasurer. Congratulations to our latest Hansjörg Eichler awardees. All the best for your research projects.

As you will read about in this newsletter, Council is still looking for a new editor for the ASBS newsletter. Many thanks to John Clarkson for stepping in as interim editor for the newsletter to see

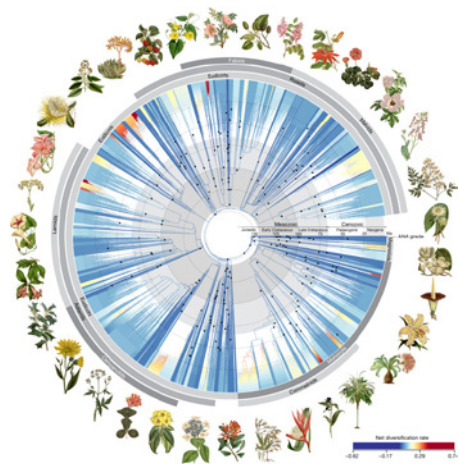
it through to issue 200. Thanks also to Helen Kennedy for agreeing to assist John with the celebratory newsletter 200. If you are interested in joining the ASBS newsletter editorial team, we would love to hear from you. Please contact John Clarkson or me to find out more about how the newsletter editorial team works together.

I would like to end with congratulating all ASBS members who have contributed to the Genomes for Australian Plants (GAP) initiative over the past five years and have made it such a huge success. The GAP initiative highlighted well what our community can achieve collaboratively and what great science we can deliver. It was really exciting to see the Flowering Plant Tree of Life published in *Nature* with a representative of almost every Australian flowering plant genus ([Zuntini *et al.* 2024](#)). Thanks to everybody involved. What a wonderful achievement!

Best wishes,
Katharina

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Zuntini *et al.* (2024) Phylogenomics and the rise of the angiosperms. *Nature* 629: 843–850.



Above: The Flowering Plant Tree of Life. Time-calibrated phylogenetic tree for angiosperms based on 353 nuclear genes (from Zuntini *et al.* 2024).

From the Editor

John Clarkson

While Council attempts to find someone to replace Lizzy Joyce as editor of the newsletter, I have offered to look after the next two issues. Kelly Shepherd, who has access to the necessary software, will help by formatting the pdf. The chair of the ECR sub-committee, Helen Kennedy, who has just submitted her PhD thesis, has offered to join me as a guest editor for the September issue. Following its 50th anniversary celebrations last year, this will be another significant achievement for the Society. The September issue will be number 200. The first newsletter, edited by Des Boyland from BRI, was published in March 1974. Since then, 22 members of the Society, acting alone or in small teams, have seen the newsletter to where it is now.

Council is currently considering the format of the newsletter. Several options are being considered and Council hopes to be able to share these with members at this year's AGM. It would be great to have a new editor in place to help with this important decision. If you think you might be interested in this task, Katharina or one of the other members of Council would very much like to hear from you.

Thank you to members who responded to my request for articles. In this issue, Heidi Meudt reports on recent changes at WELT. Reports from herbaria used to be a regular feature in the newsletter. I'll see if I can drum up a few more and I would welcome your support to ensure number 200 is a bumper issue.

Research Grants

John Clarkson

Vice President and ex officio Chair of the ASBS Research Committee

2024 Marlies Eichler Postdoctoral Fellowship

Applications for the 2024 Marlies Eichler Postdoctoral Fellowship are open and will close on Wednesday July 31.

The Fellowship is open to financial members of the Australasian Systematic Botany Society who hold

a PhD relevant to systematics of plants, algae or fungi that was completed within the last 10 years. Applicants should hold a short-term post-doctoral position at an Australasian research institution. This includes post-doctoral fellowships obtained on a competitive basis from funding agencies (e.g. Australian Biological Resources Study, Australian Research Council, Marsden Fund), or through internal institutional schemes (e.g. university post-doctoral fellowship grants). Other post-doctoral positions will also be considered. Applicants with ongoing salaried positions are not eligible for these grants.

The Fellowship will provide two years of funding. Up to \$10,000 (AUD) per year is available, with a maximum of \$20,000 over the two years. Funds can be spent on salary for the applicant or project costs (including consumables, essential minor equipment <\$5,000, travel associated with fieldwork, contracted services such as DNA sequencing, and technical assistance).

Application forms and further details can be obtained from the ASBS web site at <https://asbs.org.au/grants-awards/marlies-eichler-postdoctoral-fellowship/>

Applications for Hansjörg Eichler Research Grants

Applications for the second round of Hansjörg Eichler Research Grants for 2024 close on Saturday September 14.

Applications are welcomed for grants up to \$5,000 for research projects focused on the systematics taxonomy, phylogeny and biogeography of land plants, algae or fungi. Grants are open to all ASBS members however, preference is given to students, recent graduates, newly-established botanists and non-salaried researchers.

Application forms can be downloaded from the Society's website at <https://asbs.org.au/grants-awards/hansjorg-eichler-scientific-research-fund/>. Applicants are encouraged to carefully read the grant criteria and instructions before completing the form. If you still have any question after reading the instructions, feel free to give me a ring on 0437 732 487. Leave a message and suggest a time when you would like me to ring you back.

Hansjörg Eichler Awardees March 2024

Five applications were received in the March round. Council is pleased to announce the following successful applicants.

Charlotte Nelson (UWA) BSc (Hons)

Phylogenetic placement and population genetics of a new peatland endemic species, *Haemodorum* sp. (East Northcliffe), based on a molecular assessment.

Amount Awarded: \$3,200



Tara Evans (ADU) PhD

The identification of fossil *Brachychiton* leaves and their significance in reconstructing the evolutionary history of the genus.

Amount Awarded: \$2,440



Riyad Hossen (MELU) PhD

Reassessing the Lineage Relationships in Bryopsidales Algae through Phylotranscriptomics.

Amount Awarded: \$5,000



An integrative taxonomic study of the *Pterostylis macrosepala* (D.L.Jones) G.N.Backh. complex (Orchidaceae; Pterostylidinae)

Hansjörg Eichler Scientific Research Fund Report

Ryan P. O'Donnell, Division of Ecology & Evolution, Research School of Biology, Australian National University, Canberra ACT, 2601, Australia



Figure. 1 Flowers of members of the *P. macrosepala* complex: (L to R) *P. macrosepala* (Conimbla), *P. tenuis* (Mount Canobolas), *P. readii* (Mount Kaputar), *P. umbrina* (Black Mountain), *P. crassa* (Goodwin Creek).

The ‘Greenhood orchids’ of subtribe Pterostylidinae—currently circumscribed as the large genus *Pterostylis* R.Br.—are a key example of ‘taxonomic turmoil’ within the Australian orchid flora (Hopper 2009). *Pterostylis*, the largest genus of the tribe Cranichideae, is a predominantly Australian group of terrestrial orchids comprising over 300 species occurring within Australia, Papua New Guinea, New Caledonia, Indonesia, New Zealand, and East Timor (Jones 2021; Reiter *et al.* 2021; Nargar *et al.* 2022). Recent plastid phylogenomic work on *Pterostylis* elucidated subgeneric limits within the group (Nargar *et al.* 2022); however, as these approaches were not designed to interrogate spe-

cies-level relationships, interspecific relationships at finer scales could not be satisfactorily resolved.

The majority of species in *Pterostylis* have been described solely on morphological characters, and have not been tested rigorously using molecular or other lines of evidence. Population-scale studies incorporating molecular data that interrogated interspecific boundaries in *Pterostylis* have to date been unable to detect substantive genetic boundaries between putative species (Sharma *et al.* 2001; Janes *et al.* 2012). However, recent studies of the pollination and chemical ecology of *Pterostylis* have revealed the presence of sexually

deceptive pollination within the group within the group (Phillips *et al.* 2013; Thalwitzer *et al.* 2018; Reiter *et al.* 2019; Hayashi *et al.* 2021, 2022). Sexually deceptive pollination is defined as rewardless flowers achieving pollination through the sexual attraction of male insects by means of physical and/or chemical mimicry of female insects (Peakall 1990; Schiestl 2005; Gaskett 2011; Phillips *et al.* 2013). The production of distinct floral volatiles associated with insect sex pheromone mimicry has been demonstrated to underpin reproductive isolation in other sexually deceptive Australian orchids (Peakall and Whitehead 2013; Menz *et al.* 2015; Phillips *et al.* 2015; Weinstein *et al.* 2022). Thus, it is probable that similar differences in floral chemistry may reveal the presence of discrete boundaries between morphologically and genetically invariable taxa in *Pterostylis*.

Upon starting my PhD, my supervisors and I began the search for a suitable species complex in *Pterostylis* that might benefit from a rigorous integrative study. After some consultation with Lachlan Copeland and Gary Backhouse, we arrived at the *Pterostylis macrosepala* (D.L.Jones) G.N.Backh complex (Figure 1) as a potential study group. *Pterostylis macrosepala* is typified from the Comimbla Range in the Central West Slopes of New South Wales and has been subdivided into at least five separate species spanning from the South West Slopes to the Northern Tablelands of New South Wales—*P. crassa* (D.L.Jones) G.N.Backh., *P. macrosepala*, *P. readii* (D.L.Jones & L.M.Copel.) D.L.Jones (Figure 2), *P. tenuis* (D.L.Jones) G.N.Backh., and *P. umbrina* (D.L.Jones) G.N.Backh. (Jones 2006, 2021; Jones and Copeland 2017).

Funding for medium-density genotyping-by-sequencing (GBS) of two plates of leaf samples with DARTseq was provided through an ANU Research School of Biology Seed Funding grant, and our Hansjörg Eichler grant proposal requested funding for an additional third plate of samples. This report is a brief summary of the work that has been carried out since.

Field collections of target taxa were carried out across the winter-spring flowering seasons in 2022 and 2023. In addition to the core study group, additional populations of *P. jonesii* G.N.Backh., *P. longifolia* R.Br., and *P. stenosepala* (D.L.Jones) G.N.Backh. were also sampled as outgroup taxa.



Figure 2. *Pterostylis readii* in situ at Mount Kaputar with the author (R.P O'Donnell) for scale. Photo: K.E. O'Hara.

Ample rain earlier in 2022 resulted in a good flowering season; however, flowering in the subsequent (much drier) 2023 season was greatly reduced. Due to the patchy and sporadic nature of the species in this complex, some populations could not be located. The aforementioned abundance of rain also meant that certain populations were rendered inaccessible due to landslides or track damage.

Exploratory analysis of labellum chemical extractions by James Perkins (ANU) showed minute differences between putative taxa. Consequently, we decided that the best course of action would be to sequence fewer individuals at higher coverage in order to have the greatest discriminatory power. Funds originally allocated for a third plate of samples were instead used to upgrade our medium-density coverage to high-density coverage. Some herbarium specimens from CANB were included for sequencing; however, these samples were generally removed by filtering steps due to poor sequence quality.

There were some delays in preparing and sending

collected leaf material to DArT for sequencing on account of the early birth of my daughter and my subsequent parental leave. In recent weeks we have received data back from DArT and I am now in the process of analysing it. Preliminary results suggest that there are discrete genetic clusters that correspond with Jones' previous taxonomic concepts (Figure 3). Two broad clusters can be observed; a northern cluster comprising *P. macrosepala*, *P. tenuis*, and *P. readii*; and a southern cluster comprising *P. umbrina* and *P. crassa*. Further analysis will be required to detangle the extent of genetic divergence with and between these clusters, and whether the patterns of population structure observed are simply the result of isolation by distance.

While trying to locate additional populations of *P. umbrina*, I was made aware of a population on Mount Jerrabomberra by Tobias Hayashi, with the proviso that *P. umbrina* appeared to grow sympatrically with *P. jonesii* at this locality. When I went to collect at this particular site, the two taxa did indeed grow sympatrically, and were difficult to separate based on what I thought were informative morphological characters. Unexpectedly,

our preliminary results suggest that *P. umbrina* and *P. jonesii* appear to be hybridising at Mount Jerrabomberra. Genotype classification using NewHybrids (Anderson and Thompson 2002) identified signals of backcrossing between both parental lineages, suggesting that hybrid individuals at this site are capable of persisting beyond the F_1 generation (Figure 4). This result is particularly surprising, considering that *P. umbrina* and *P. jonesii* are each pollinated by different operational taxonomic units (OTUs) of *Mycomya* Rondani (Diptera; Mycetophilidae) (Hayashi *et al.* unpublished data).

There are several assertions of natural hybridisation in *Pterostylis* in the literature (Jones 2006); however, these reports are anecdotal and based solely on morphology. While Sharma and Jones (1999) provided the first molecular evidence for natural hybridisation in *Pterostylis* using starch gel electrophoresis, there was no suggestion of persistent backcrossing or introgression. In an analysis of the *P. longifolia* complex using amplified fragment length polymorphism (AFLP) markers, Janes *et al.* (2012) identified some signatures of shared ancestry between populations

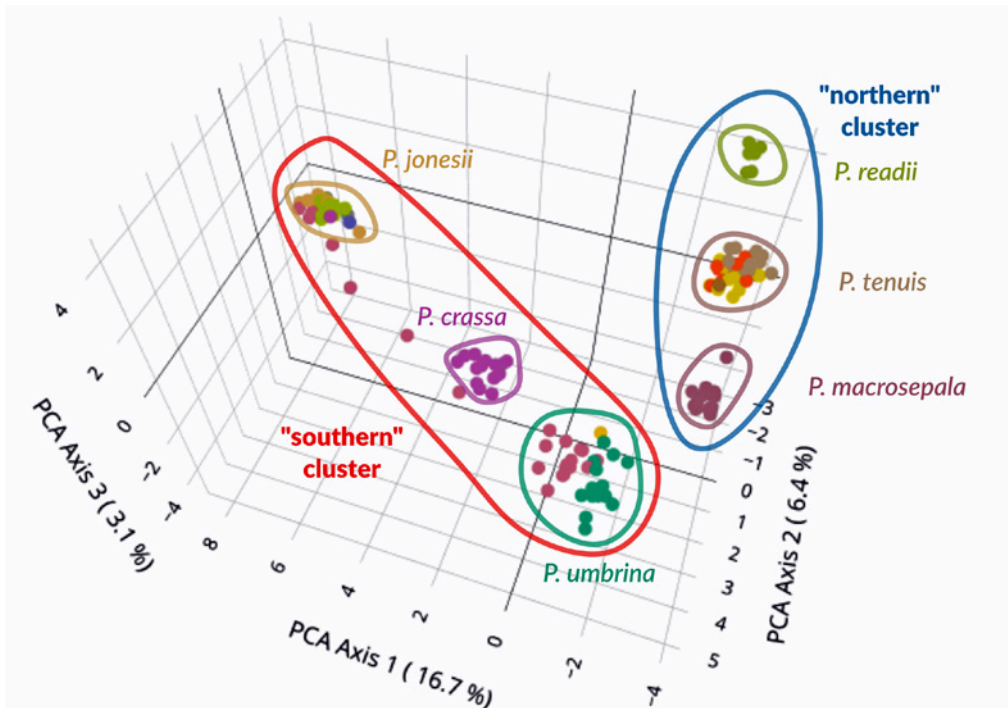


Figure 3. 3D principal components analysis (PCA) plot of DArTseq single nucleotide polymorphism (SNP) data with geographic clusters and putative taxa labelled.

putatively assigned as distinct species. While admixture plots presented by Janes *et al.* (2012) did appear to exhibit patterns of gene flow between populations/putative species, no explicit tests for hybridisation/introgression were carried out. However, the authors did argue that any population structure observed was most likely the result of incomplete reproductive barriers between potentially oversplit, genetically invariable taxa. While Janes *et al.* (2012) concluded that their study taxa were likely representative of a single species on the basis of little genetic differentiation, later work in other sexually deceptive orchids has shown that only minute genic (rather than genomic) differences may result in reproductive isolation through ecological or temporal isolation (Peakall and Whitehead 2013; Sedeek *et al.* 2014; Menz *et al.* 2015). Therefore, it is probable that genetically and morphologically indistinct sexually deceptive orchids may indeed represent discrete species despite a lack of substantive genomic divergence.

Hybridisation and backcrossing between species of sexually deceptive orchids has been identified

in genera outside Australia—e.g. *Ophrys* L. (Cozzolino *et al.* 2006; Stökl *et al.* 2009; Cotrim *et al.* 2016)—but there is little evidence in the Australian orchid literature of persistence of sexually deceptive hybrids beyond the F_1 generation. Although Peakall *et al.* (1997) confirmed *Chiloglottis* $\times$ *pescottiana* R.S. Roger as a naturally-occurring hybrid between the sexually deceptive species *C. valida* D.L. Jones and *C. trapeziformis* Fitzg., there was no evidence to suggest that hybrids between these two species were capable of reproducing beyond the F_1 generation in a natural context.

As our sample sizes were limited, and the fact that hybridisation was an unexpected finding in our analyses, the true extent of backcrossing and introgression occurring at Mount Jerrabomberra is still unclear. Notwithstanding, if our preliminary results are accurate, they may represent the first empirical evidence of a hybrid swarm among Australian sexually deceptive orchid species. Mount Jerrabomberra may present an interesting locality for future studies.

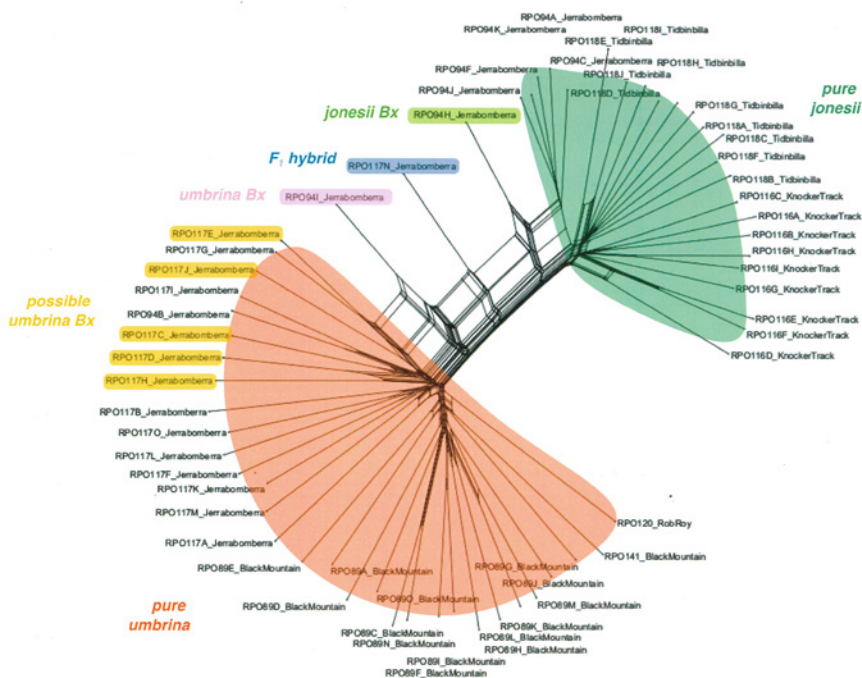


Figure 4. SplitsTree (Huson and Bryant 2006) of DArTseq SNP data for populations of *P. umbrina* and *P. jonesii* with NewHybrids (Anderson and Thompson 2002) genotype classifications overlaid.

Next steps for this project involve finalising our population genetic analyses, chemical analysis of floral volatiles, pollinator baiting experiments, and analysis of morphological data. Further updates will hopefully be provided as a publication with our final results within the next year or two while I complete my PhD. Many thanks again to the Australasian Systematic Botany Society and their support with the Hansjörg Eichler Scientific Research Fund which has made this project possible.

Acknowledgements

I wish to thank my PhD supervisory panel; Celeste Linde (ANU), Rod Peakall (ANU), and Ryan Phillips (LTU) for their continued mentorship, support, and assistance with this project. I also acknowledge the support of the Australian National University Research School of Biology Seed Funding Grant. Thank you, Kate O'Hara, Fred Jaya, Guy Taseski, Harrison Whittaker and Amy O'Donnell for assistance with fieldwork. I thank the Australian National Herbarium (CANB) staff for their assistance; namely, Heidi Zimmer for sampling of leaf material from herbarium specimens, and Brendan Lepschi for collection permissions. Thanks again to Lachlan Copeland and Gary Backhouse for assistance with locating populations of our target species and for their helpful comments with respect to focusing our study group. Additional thanks to Tobias Hayashi for assistance with locating additional populations of *Pterostylis* and for comments regarding the pollination of *P. umbrina* and *P. jonesii*. Finally, thank you to the numerous park rangers and managers who have provided assistance with access to parks and reserves, in particular the NSW Central West team for their recovery efforts following a 4WD bogging.

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Flowering in *Wolffia australiana*

Phil Garnock-Jones

phil.garnock-jones@vuw.ac.nz

The world's smallest flowers are in the genus *Wolffia* (Araceae), where even whole plants are smaller than most other tiny flowers. *Wolffia* flowering is not often observed, but that's hardly surprising. I collected these plants last March and brought them home to try to induce flowering with short days and gibberellin. But when I put them under the microscope I found some were already in flower.

Wolffia plants are monoecious, with one male and one female flower each. The flowers develop in a cavity on the upper surface of the plant.



Figure 1. *Wolffia* plants in flower. The pin-head stigma emerges as the floral cavity first opens (top left), a sort of interfloral protogyny. The stamen

elongates and the anther dehisces later (right); in this plant the stigma seems to have been withdrawn into the cavity. In the bottom plant, the anther has withdrawn, but the stigma is still presented.

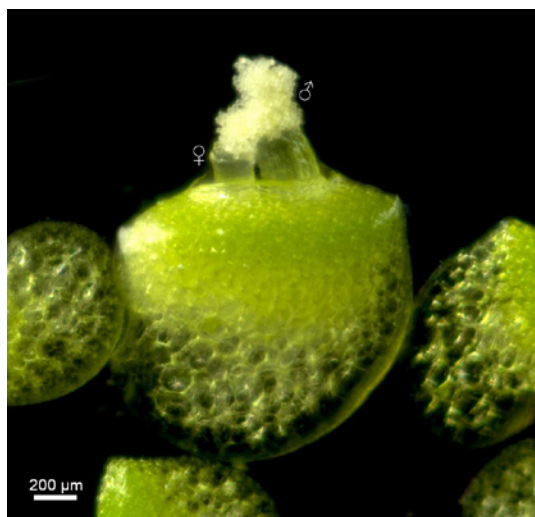


Figure 2. Like an iceberg, most of the *Wolffia* platelet is below the waterline. There's a period of overlap when self-pollination is possible, even likely. And because *Wolffia* often reproduce asexually by budding, it's likely that neighbouring plants will be clones and so mating among them is genetically the same as selfing. The stamen is about twice as tall as the style (left), and one of its two pollen masses has fallen onto the stigma. The upturned rim of the flowering cavity can be clearly seen.

WELT Herbarium news

Heidi Meudt

Museum of New Zealand Te Papa Tongarewa

Staff changes

WELT has had a number of staff changes since our last updates in the ASBS newsletter in September [2020](#) and June [2021](#). In 2021, and after 15 years of fixed term contracts as Botany Researcher, Heidi Meudt became a Botany Curator, joining Leon Perrie and Carlos Lehnebach. In 2022, quite a few changes occurred. Antony Kusabs resigned as Collection Manager of Botany to take on a role at ecological consulting company Boffa Miskell Limited. Bridget Hatton, who was previously Technician, took on the role of Botany Collection Manager and has quickly found her feet. Julia Wilson-Davey returned to Botany as Technician and is now focused on acquisitions after five years on the museum's Digital Collections & Access team which looks after our database, EMu.

During 2023-2024, we sadly said goodbye to several of our wider team. WELT suffered a huge blow with the sudden [death](#) of our retired former Botany Curator, Patrick Brownsey. We continue to grieve for Patrick, and his absence at the herbarium is acutely felt every day. We also very much miss Botany Research Associate [Peter Beveridge](#), who moved to Christchurch to be closer to his family. Finally, earlier this year, long-serving Botany volunteer (and Te Papa host) Lydia Ng retired and left Wellington to move closer to her family.

Our current Botany team now consists of the following people:

- Botany Curators: Leon Perrie, Carlos Lehnebach, and Heidi Meudt
- Collection Manager: Bridget Hatton
- Technician: Julia Wilson-Davey
- Volunteers, Students and Research Associates: Barry, Ben, Bev, Eleanor, Lucia, Jane, Jennifer, Jill, Liqin, Marina, Shannon, and Tia

WELT is now on GBIF and other collection and digitisation milestones

WELT Herbarium at Museum of New Zealand Te Papa Tongarewa has just [published its specimen data and images](#) to the Global Biodiversity Information Facility (GBIF). This adds 250,000 records and over 90,000 images of all plant groups, with particular strengths in seed plants of Aotearoa New Zealand and the Pacific. Our dataset is being updated every week with additions and changes. Read more about it [here](#).

Our camera set-up for digitising specimens has been running red hot recently. For the past two years, the Botany team has challenged itself to digitise at least 12,000 specimens per year – that's about 2,000 each for Carlos, Leon, Heidi, Bridget and Julia, and even our Head of Natural History, Phil Edgar is participating in the challenge. In addition, we have volunteers, students, and interns imaging specimens, which takes some coordination since we all share one camera set-up. This financial year (July 2023 – June 2024) we are on track to add 30,000 images! This means 45% of all the sheets of databased flowering plants, ferns and algae at WELT are now imaged.

We've also acquired some notable collections in recent years. For example, have processed the majority (about 3,250 specimens so far) of a donation from botanist John Lovis (1930-2017), and [most are available on Collections Online with images](#), with images. Similarly, we've been accessioning a large donation of c. 4,000 liverwort specimens from bryologist Rodney Lewington (1935-2018). Julia is about 70% done with these, and [with many again available on Collections Online](#), some with images.

Te Papa Botany Curators publish several books

The three curators have been busy publishing books over the past couple of years. Carlos was one of five editors of [*Flora: Celebrating Our Botanical World*](#), which has over 400 objects from Te Papa related to plants and botany, including specimens, artworks, artifacts, textiles, and photographs. Heidi and Carlos wrote [*Native Plants of Aotearoa*](#), one of four books in the Te Taiao Nature series, which highlights 50 native plants and includes black and white illustrations by Sydney Parkinson from James Cook's first voyage to New Zealand. Leon and Patrick finished the *Fern and Lycophytes* series led by Pat for the *Flora of New Zealand*, which is now [freely available online](#). Finally, a book based on the *Flora, Identification Guide to the Ferns and Lycophytes of Aotearoa New Zealand* also by Leon and Pat, [will be published in August 2024](#).

Research & field work updates

Over the past three years since our last update, Heidi has completed additional [*Myosotis* field work](#) on the South Island in 2021-2022. She was also invited to participate in a month-long field expedition to Auckland Island in January 2023, which she has blogged about in a [series of eleven blogs](#). And the PhD student she co-supervised with Jennifer Tate, Weixuan Ning, whose research was partially funded by a Hansjörg Eichler Research Grant, [recently completed his PhD](#) at Massey University!

Leon's research on ferns of the south-west Pacific continues, with collecting trips in 2023 to [Norfolk Island](#) and [Lord Howe Island](#) with Te Papa's geneticist Lara Shepherd and Daniel Ohlsen of Royal Botanic Gardens Victoria. Leon is also helping Lara with her investigation of [taramea](#), [Aciphylla](#) (Apiaceae).

Carlos has been working in a number of projects focused on the taxonomy and conservation of New Zealand orchids. His current [taxonomic work](#) includes the genera *Corybas* and *Prasophyllum*, where a number of new species are waiting

formal description. [Orchid conservation work](#), on the other hand, is in collaboration with colleagues from Ōtari Botanic Native Garden and focuses orchid-mycorrhizal interactions and the implementation of propagation methods. Carlos is currently co-supervising three MSc students whose theses projects are looking into the effect of climate change on flowering and distribution of NZ terrestrial orchids ([Joe Dillon – Victoria University of Wellington](#)), taxonomy and hybridisation in NZ sun orchids ([Hayden Jones – Massey University](#)) and Conservation of NZ *Corybas* (Rebecca Greenwood – The University of Auckland and Manaaki Whenua Landcare). Carlos is currently the Chair of [CHAH](#) and the [NZ National Herbarium Network](#).

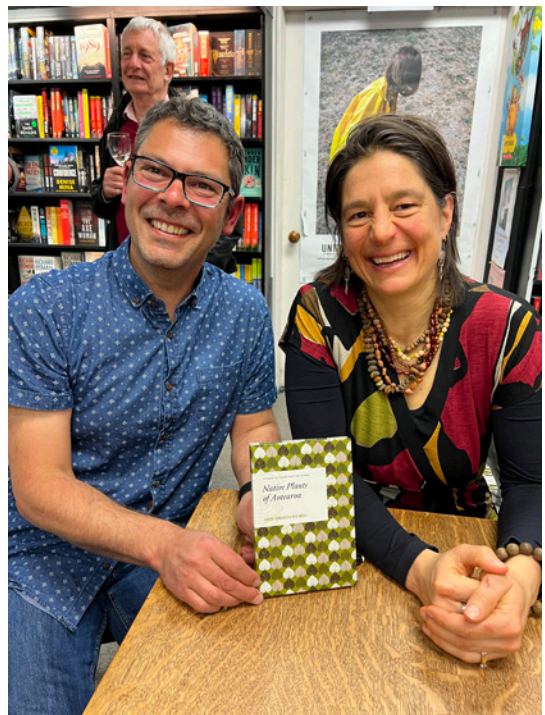


Figure 1. Carlos Lehnebach and Heidi Meudt at the launch for *Native Plants of Aotearoa*. Patrick Brownsey in the background.

Matthew Flinders is Going Home

John Clarkson
Atherton

After 200 years in an abandoned cemetery where no one was quite sure where his remains lay, Matthew Flinders will soon be reinterred with full naval honours in his home village of Donington in Lincolnshire.

On 19 July 1814, the day after his account of the Investigator voyage, *A Voyage to Terra Australis* (Flinders 1814), was published, Matthew Flinders died from kidney disease at his London home. Four days later, on 23 July, his body was interred in the burial ground of St James's Church, Piccadilly.

The graveyard was closed for burials in 1852 and fell into neglect (Web ref. 1). When Flinders' sister-in-law visited the cemetery that year she could find no trace of the grave. In 1887 most of the headstones were cleared away and the area redeveloped into a city park named St James's Gardens. Since then, expansions of Euston Station have encroached on parts of the gardens. A popular myth suggested Matthew lay somewhere under platform 4 —or was it platform 12, or perhaps platform 15?

In August 2017, after years of debate and legal challenges, contracts were signed for the construction of a highspeed rail line (HS2) between London and Birmingham. This spawned one of the largest archaeological explorations ever conducted in Britain (Web ref. 2). With the London end of the line terminating at Euston Station, the land occupied by St. James's Gardens was needed for the expansion. Beginning in October 2018, a team of archaeologists began the careful removal of remains from the old burial ground. In the end the remains of almost 20,000 individuals were recovered. With no headstones and no burial map of the old churchyard, the only way an individual could be identified was if the coffin unearthed had a name plate. Very few had, and those that were located were made from tin that had not survived well in the wet London soil. Fortunately, when Flinders was buried the name plate on his coffin was made of lead. The archaeologists were thrilled when they located a coffin in January

2019 with a lead nameplate (Fig.1) bearing the inscription:

Capt Matthew
Flinders RN
Died 19 July 1814
Aged 40 Years

Matthew had been found (Web ref. 3). While decisions were made on where he would be reinterred, his remains were examined by osteo-archaeologists looking for indications of how his life at sea affected his health.

Would he be reinterred with the others located at St James's? Somewhere in Australia was even briefly considered. While this was happening, a number of residents from Matthews' home village of Donington in Lancashire formed *The Matthew Flinders Bring Him Home Group* (MFBHH) (Web ref. 4) and successfully lobbied to have him buried in their parish church of Saint Mary and the Holy Rood. This is the church where Matthew was baptised and where many members of his family, including his brother Samuel and his father Matthew Sr and other ancestors, are buried.

The burial, which is scheduled to take place on Saturday 13th July, will be part of 3 days of commemorations of Matthews' life. The Church of England has given permission for the burial to take place within the church (Fig.1). It will be the first burial within the church since the 19th century.

As a naval captain, Matthew will receive an 18 gun salute and his coffin will be carried by six pallbearers from the Royal Navy's state ceremonial team. He will be reburied in a replica of his original coffin constructed by Robert Hartle, one of the archaeologists who worked on the excavation of St James's burial ground (Web ref. 5).

The remains of around 14,500 individuals recovered from the excavation at St James's Gardens have been reinterred in the Brookwood



Figure 1. Left: The lead name plate that identified Flinders' grave. Right: Matthews will be buried inside the Church Saint Mary and the Holy Rood. Following the burial, the grave will be covered by a ledger stone carved by Alan Micklethwaite (Web ref. 7) on stone especially brought from Ireland to match other ledger stones in the church. Behind the grave can be seen a stained glass window showing a full length figure of Matthew Flinders flanked by images of fellow Lincolnshire men, Joseph Banks and George Bass. The widow was a gift from the Commonwealth of Australia and Australian States, (Web ref 8).

Cemetery in Surrey. The remains of a further 5,500 individuals are undergoing archaeological analysis and will be reinterred at Brookwood on a future date (Web ref. 6).

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Web ref. 3. <https://www.hs2.org.uk/building-hs2/archaeology/st-james-gardens-burial-ground/captain-matthew-flinders/>

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Web ref 8. <https://heritage-explorer.lincolnshire.gov.uk/Monument/MLI22493>

Note: The MFBHH Group can be followed on Facebook at <https://www.facebook.com/groups/2266227553619013/>

New (old) names for two native *Plantago* species

Heidi Meudt (heidim@tepapa.govt.nz) and

Miguel Salas (Miguel.deSalas@tmaq.tas.gov.au)

Plantago brownii F.Dietr. is the correct name for *P. triantha* Spreng.

In the course of writing a new Wikipedia article for *Plantago triantha* (Fig. 1, Web Ref 1), Heidi came across Mabberley et al.'s recent work on Robert Brown names (Mabberley 2020, 2022).

The taxonomic history of *P. triantha* has been reviewed recently (Meudt 2012). To summarise, it was thought that the earliest replacement name for the illegitimate name *P. carnososa* R.Br. was *P. triantha* Spreng., which was published by Kurt Sprengel in 1824 (Sprengel 1824). However, Mabberley and his colleagues have uncovered an earlier replacement name that was published in 1820 by Friedrich Dietrich, which is *Plantago brownii* F.Dietr. (non *P. brownii* Rapin) (Dietrich 1820).

Plantago brownii F.Dietr. has priority, and we prefer changing the name rather than trying to conserve *P. triantha* Spreng. Given that this plant is not a very common species (native to Tasmania and the Auckland Islands), this change should have minimal effect on the botanical community. *Plantago brownii* F.Dietr. is already being used by World Plants (Web Ref 2), Plants of the World Online (POWO) (Web Ref 3), IPNI (Web Ref 4), the New Zealand Plant Conservation Network (Web Ref 5), and herbarium CHR (Web Ref 6).

In addition, using *P. brownii* F.Dietr. will give credit where it is due: to Dietrich, whose work and names were ignored by Sprengel, and to Robert Brown, who studied and published on these plants in 1810 (Brown 1991).

Plantago leptostachys Hook.f. is the correct name for *P. daltonii* Decne.

Meanwhile, Miguel was asked to add the name *Plantago daltonii* Decne. to the iNaturalist plant

taxa list. It had been listed as a synonym of *Plantago tasmanica* Hook.f. in both iNaturalist and POWO, but the two are considered separate taxa in Tasmania (Brown 1991).

In his 1852 treatment of Plantaginaceae, Decaisne used *P. daltonii* (Decaisne 1852) as a replacement name for Hooker's 1847 name *P. leptostachys* Hook.f. (Hooker 1847). Decaisne saved the name *P. leptostachys* for a separate taxon he described later in the same 1852 publication: *Plantago leptostachys* E.Mey ex Decne (Decaisne 1852).

Since *P. leptostachys* Hook.f. was not illegitimate at the time (because Hooker's 1847 *P. leptostachys* has nomenclatural priority), it is the correct name for this taxon, while *P. leptostachys* E.Mey ex Decne. is both superfluous and illegitimate.



Figure 1. *Plantago triantha*, Auckland Island, January 2023, (iNaturalist observation: <https://www.inaturalist.org/observations/183630617>), Heidi Meudt

The importance of digital outreach

We note that both of these nomenclatural issues came to our attention and were subsequently resolved as a result of our participation on community science platforms, in this case iNaturalist and Wikipedia. We strongly support botanists doing such “digital outreach” by actively participating on these and other online biodiversity platforms. As our short article here shows, doing so not only provides value to the public by making the most up-to-date biodiversity information openly available to them, but can provide value to taxonomic research in return.

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- Web Ref 5 <https://www.nzpcn.org.nz/flora/species/plantago-brownii/>
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It was great while it lasted

Book review by John Clarkson, Topaz

The Australian Botanical Liaison Officer Scheme at Kew, 1937–2009

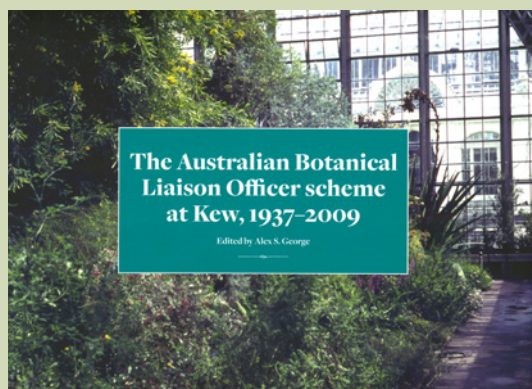
Alex S. George (ed)

ISBN 978-0-6456295-1-4 (paperback) A4 landscape format

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Available from Alex George, a.george@murdoch.edu.au



It was not until Mueller was appointed Government Botanist in Victoria in 1835 that a formal collection of Australian plants began to be assembled here. Early collections of Australian plants were sent overseas where they were described by British and European botanists and where their types were lodged. Thus, these herbaria, particularly the Royal Botanic Gardens Kew, became important repositories of Australian historical specimens. The vast libraries in these institutions also contained many works that were unavailable in Australia. However, until the middle of the 20th century international travel from Australia to Europe was expensive and time consuming. Until the advent of affordable air fares, travel to the UK involved a long sea voyage. Australian botanists were faced with the challenge of describing their

flora without ready access to specimens and literature located on the other side of the world. This led Arthur Hill, an Englishman and Director of the Royal Botanic Gardens, Kew to comment in a letter to David Rivett, an Australian and CEO of Commonwealth Scientific and Industrial Research (CSIR); *"The trouble in the past has always been that the Australian botanists as a rule have not bothered to write to us about their difficulties and in consequence have committed a great number of errors in the way of identification and description of supposed new species"*. In reply Rivett wrote; *"Somehow one is forced to conclude that the Australian botanists have not a particularly big amount of the co-operative spirit either born or bred into them."*

India and South Africa had had botanical liaison officers based at Kew for many years and W.D. Francis from the Botanic Museum and Herbarium in Brisbane had worked at Kew for 15 months from January 1930 to March 1931 so Hill, to his credit, recognised the obvious benefit of also having an Australian botanist based at Kew. The ABLO scheme, the focus of this book, owes much to Hill's persistent lobbying of Australian authorities over the best part of a decade from 1927, when he visited Australia, to 1937, when Charles Gardner took up the post.

This book is a history of the Australian Botanical Liaison Scheme, a scheme that ran for 72 years between 1937 and 2009, albeit with a 10-year hiatus during the second World War. Fifty-two men and women from Australia occupied the position. For many, it was their first visit to the UK and, for most, a once-in-a-lifetime opportunity to live and work in the UK and to visit key herbaria in Europe. The average age on appointment was 43. The average term was about 12-13 months although three early ABLOs stayed much longer. Charles Gardner spent 32 months in the position, Mary Tindale 27 months and Nancy Burbidge 22 months). All but two (Don Foreman and Jenny Tonkin) returned to their home institutions on completion of their term and 41 of them remained there until retirement.

I remember Alex George, the author of this book, reminding delegates to the *History of Systematic Botany in Australia* conference held in Melbourne in 1998 that “history is now” so it is pleasing to see the history of the ABLO scheme published while the memory of the scheme is fresh in many people’s minds and many former ABLOs are still alive.

Having said that, there is perhaps no one better placed to relate the history of the ABLO scheme than Alex George. Alex served two terms as ABLO (the only person to do so). He has the distinction of not only being the youngest person to take up the position (he was 28 when he began his first term in December 1967) but also the oldest (he was 65 when he began his second term in November 2004). In addition, he accompanied his

then partner, Roberta Cowan, when she served as ABLO from 1 December 2002 to 30 November 2003. Australia got two for the price of one that year! Alex met all but two ABLOs. C.T. White and Frank Morris were the missing pair.

The book is an easy and interesting read and is illustrated by a wonderful selection of photographs by Alex and others. It is a valuable contribution to the history of a scheme, the likes of which we are unlikely to see again.

Adapted from a speech given at the launch of the book at the Biosystematics2023 Conference, Canberra, 29 November 2023.

Illustrated career of a botanical artist

Book review by John Leslie Dowe, Australian Tropical Herbarium

Botanical Sketchbooks: An Artist’s Guide to Plant Studies

Lucy T. Smith

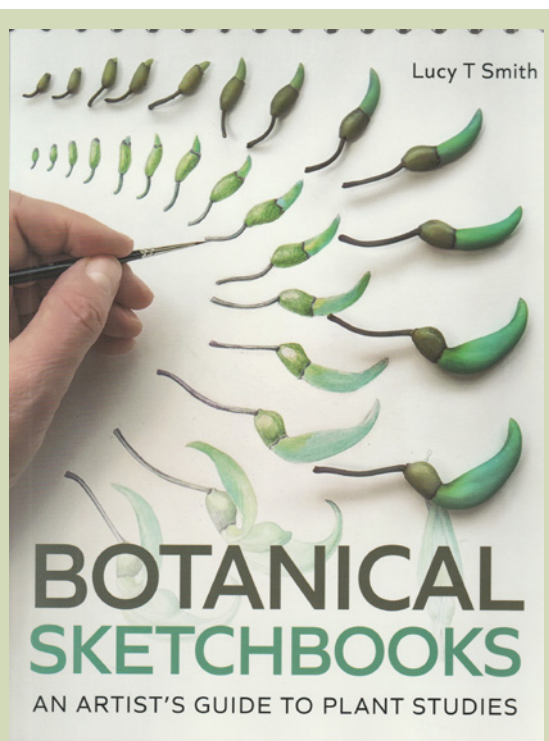
ISBN: 978-0-7198-4337-2 (paperback) 11.02” x 8.66”

Crowood Press Ltd, Marlborough, Wiltshire (U.K.), 01 April 2024, pp. 175.

RRP: AU\$46.82 (includes postage)

Available from Blackwell’s <https://blackwells.co.uk/bookshop/product/Botanical-Sketchbooks-by-Lucy-Smith/9780719843372>

<https://www.lucytsmith.com/galleries>



This book provides insight into how Australian-born and educated Lucy Therese Smith has conducted her career since moving to the UK some 25 years ago to pursue a career as a botanical illustrator at Royal Botanic Gardens

Kew. It also provides guidelines for botanists and botanical collectors on how best to prepare their specimens for use as subjects for botanical illustrations. Lucy has received many awards for her artwork, including the Jill Smythies Award for

Botanical Illustration (Linnean Society), two gold medals from the Royal Horticultural Society, and First Prize (twice) in the Margaret Flockton Award for Botanical Illustration. In 2020 she was awarded the Botanical Illustrator Award for Excellence in Scientific Botanical Art from American Society of Botanical Artists (<https://www.lucytsmith.com/about>).

Overall, this is not a 'how-to-do-book' but rather a personal 'how-I-did-it' account of a very productive, highly awarded and competent botanical artist, and her journey to perfect the depiction of plants and how best to convey that in pencil, ink and colour on paper. In her own words, how "to capture the character and beauty of a plant and make it look alive on the page." In addition, she writes that the skills she has acquired and honed over a thirty year career, most of it at Kew, "underpin the marriage of art and science that lies at the heart of botanical art and illustration."

The book is lavishly and copiously illustrated with examples of her work, totalling about 300 figures. In some it shows the progression from simple sketchbook outlines to the completed work. However, underlying this is a complex process of getting to understand the subject, deciding what makes the particular species distinct and how best to portray it so that botanists can obtain an almost instant and precise record of the species that they are describing.

The book follows a practical series of nine chapters: Materials; Methods and Techniques; Flowers, Fruits, Pods, Cones and Seeds; Succulent, Cacti and Other Pot Plants; Working in the Field; Capturing Trees Throughout the Seasons; Scientific Botanical Sketchbook; and How Sketchbook Studies Inform the Finished Work. There is a concluding thorough index.

The layout of the book is very attractive: turning the pages introduces one to another plant, another example of how the artist works and how the finished work is completed. In the concluding section, the author writes: "My botanical artwork is highly ordered and organised, drawn for specific professional purposes." In contrast this book exposes the creative process of botanical 'art'. The author writes: "the physical process

of experiencing plants by touching with your hands, observing with your eyes, and moving a pencil across the page is where ideas start to take concrete shape."

The writing style is mostly autobiographical, written mainly in the first-person but in the second-person when describing materials and methods. This style provides an insight into the specific uses, workings and benefits of the materials traditionally used to produce botanical art: pencils, pens, inks, papers, etc. The jargon, peculiar to art materials, is kept to a minimum but enough to educate those who know little about this aspect of botanical art. Similarly, the use of botanical terms is kept to a minimum, although it is clear in the precision of their use that the author is just as much a botanist as she is an artist.

Among the highlights of the book include the illustrations of waterlilies and palms. The waterlily flower dissection paintings are perhaps among her best works, both in artistic expression and in diagnostic illustration. In addition, palms (Arecaceae) have been one of the artist's specialities, in both habitat paintings and in diagnostic illustration. Indeed, the artist has fully come to terms with understanding and illustrating the complex phyllotaxy (i.e., the arrangement of leaves) of palm crowns, an ability that eludes many palm illustrators.

More of her waterlily paintings and illustrations can be seen at: <https://www.lucytsmith.com/galleries/victoria-waterlilies>, as well as <https://www.lucytsmith.com/blog/victoria-boliviana-a-new-species-of-giant-waterlily>; and the description of *Victoria boliviana* can be seen at: Lucy T. Smith et al, Revised Species Delimitation in the Giant Water Lily Genus *Victoria* (Nymphaeaceae) Confirms a new species and has implications for its conservation, *Frontiers in Plant Science* (2022). DOI: [10.3389/fpls.2022.883151](https://doi.org/10.3389/fpls.2022.883151).

Among the finest examples of her palm diagnostic illustrations are those published recently in *Palms of New Guinea*, in which all the 250 species included in that work are accompanied by a full-page diagnostic illustration. *Palms of New Guinea* can be seen at: <https://zenodo.org/records/10794336>.

There is no attempt to describe the history of botanical art or examples of other artist's work. This book is a thorough documentation of the progressive development of one artist and her journey toward becoming the best artist that she could. Although essentially an art book that can be appreciated in the genre of botanical art,

it is highly recommended for taxonomists and botanical collectors; it alerts researchers and workers about the need to collect representative and complete-as-possible specimens, and how those specimens can be best represented in diagnostic illustrations.

An intriguing intro to forensic botany

Book review by Kelly Shepherd, Western Australian Herbarium

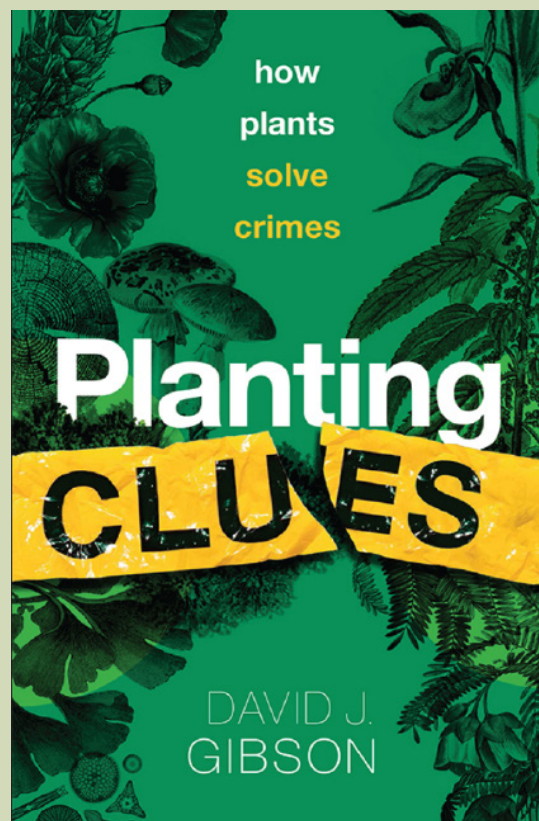
Planting Clues: How Plants Solve Crimes

David J. Gibson

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Criminal cases involving plants are arguably as diverse and fascinating as plants themselves. Botanical forensic clues may be derived from various sources, including plant-based drugs and toxins, or represent critical trace evidence in the form of pollen, spores, leaves, flowers, and seeds. By analysing these kinds of evidence, investigators may link perpetrators to victims or scenes in serious criminal cases such as kidnapping, assault or murder.

Many of us are morbidly intrigued by stories about crime, evidenced by the huge popularity of murder mystery books, tv shows, and true crime podcasts. However, few of these cases (imagined or real), explore the vital role that plants can play in solving crimes. David Gibson's book *Planting Clues* takes a step towards addressing this gap by providing a snapshot of a wide range of cases involving plants (and fungi).

The preface of this captivating book begins with an illustrative case: a thwarted attempt to smuggle 66 live orchids out of Costa Rica in 2015. Regrettably, such incidents are neither uncommon nor isolated and many smuggling cases go undetected. Others remain unsolved, for example in February 2023, nearly [900 rare orchids](#) were brazenly stolen from garden beds at Kings Park and Botanic Garden in the city centre of Perth, and sadly were never recovered. Despite native plants being recognised as being valuable and worthy of protection in many jurisdictions, plants in general remain undervalued. Gibson makes a key point, that while many people enjoy nature, they tend not notice or appreciate plants, let alone have the skills to accurately identify them. People suffer from "plant blindness" particularly in terms of their potential to provide

essential clues at crime scenes, and this book aims to address this.

Gibson notes the critical importance of correctly and unambiguously identifying plants in criminal cases and he focuses on case studies that highlight the use of plant morphology and anatomy (Chapters 1 to 4), DNA (Chapter 5), and Chemistry (Chapter 6) to help solve crimes. He introduces scientific concepts such as taxonomy and the biological species concept but keeps the language simple and provides examples. A glossary and detailed references are also included, which provide a useful resource for those who may want to delve deeper into some cases.

Chapter 1 opens with the fascinating and tragic retelling of what was known at the time as the "Crime of the century". In 1932, the 20-month-old son of the famous American aviator Charles Lindbergh was kidnapped and subsequently murdered. The child was snatched from the upper story window of his nursery, accessed via a wooden ladder that was left abandoned at the scene. While I have read several summaries of this case, Gibson's account is by far the most compelling and detailed. He outlines the dogged and meticulous investigation by Arthur Koehler, a US Forest worker and wood expert, who was brought in to help solve the case. Not only did Koehler identify the four different species used to construct the ladder, but he also confirmed the mill where some of the wood had been manufactured by examining machine cut patterns on the surface (contacting over 1600 mills in the process). Additionally, he made a critical connection, linking wood from a ladder rail to a missing floorboard in the attic of the suspect's house by comparing nail patterns and growth rings in the wood. Gibson uses this case and many others in his book to not only outline methods involved in botanical forensic investigations, but to also teach some basic botany. In this case, he explains the difference between 'soft wood' gymnosperms and 'hard wood' angiosperms and the fact that these terms have nothing to do with wood hardness but rather their structure and the presence of vessels and tracheid cells. The latter described as being "like air conditioning tubes or trachea in insects", an example of the descriptive language he uses to educate his audience. While

this case was solved in the 1930s, the science behind the forensics is still relevant today, as in 2010 I was involved in providing evidence in a double homicide case where a major part of the evidence to convict was based on the anatomical examination of the patterns of cells in wood.

The history of forensic botany is covered in Chapter 2, where basic tenets of forensic investigation such as Locard's exchange principle and the Frye Standard and Daubert Standard (the general acceptance of scientific standards for expert evidence) are discussed. Interesting case studies are peppered throughout, including how leaves and soil stuck to the tyres of Ted Bundy's vehicle led to the conviction of the notorious serial killer, as this evidence linked him to his last victim, 12-year-old schoolgirl Kimberly Leach. Gibson also provides cautionary commentary, explaining that while someone may be qualified and deemed an expert, they still need to do due diligence and examine evidence thoroughly, provide accurate and adequate reports, and stick to the facts and not speculate. Finally, he shows how experts examining the same evidence may not dispute the facts but can interpret their findings very differently.

Further case studies based on plant fragments are explored in Chapter 3, such as the examination of gut contents to confirm a victim's last meal (apparently North Americans only ingest around 70 different plant food species), growth rates of mosses found on skeletal remains to predict time since death, and the ecology of plants growing on and around clandestine graves. I enjoy Gibson's gruesome factoids, one such being that a decomposing adult body can release around 2.6 kg of Nitrogen into the soil. Who knew?

Microscopic evidence and palynology are covered in Chapter 4. Another example of the author painting pictures with words, is evident in how he describes the two silica cell valves of a diatom (frustule), fitting together like two halves of a "vintage hat box". He goes on to explain how these unicellular aquatic algae have been useful in many forensic cases due to their abundance and unique species composition in various bodies of water. For example, the diatom test can be used when a body is recovered from water. If the person was

alive when they entered the body of water, they will inhale diatom-rich water and as their heart continues to pump diatoms will end up not only in lung tissue but in other organs and eventually in bone marrow. If the person was dead upon entry into water, diatoms are confined to the lungs, through the passive movement of water into the body. While this book largely focuses on American studies there are several Australian cases also included. Most notably, Australia's first botanical forensic case, which was the 1960 kidnapping murder of schoolboy Graeme Thorne. I have read accounts of this case before but again Gibson reveals evidence that I didn't know, reflecting his research into each case he discusses. If you don't know about this kidnapping and murder it is fascinating to find out how botanist Joyce Vickery from the Royal Botanic Gardens Sydney and plant pathologist Neville Wright from the University of Sydney provided critical clues to help solve this case.

Chapters 5 and 6 cover plant DNA and chemistry, drugs, and poisons. Including details outlining fascinating cases from history as well as modern crimes such as a Biology Lecturer and toxicology researcher from Edinburgh who tried to kill his wife by dosing her gin and tonic with atropine sulphate (a drug extracted from *Belladonna Atropa belladonna*), a professional footballer who successfully killed his wife by dissolving strychnine (which is an alkaloid extracted from seeds of shrubs in the genus *Strychnos*) in her tequila (perhaps the moral of these stories is don't let your partner make you a drink!), as well as cases about Russian assassinations, and attempted poisonings using perhaps my favourite plant toxin, ricin, which is derived from seeds of the castor oil plant and is 600 times more toxic than cyanide. The final chapter rounds out Gibson's coverage of forensic botany by discussing illicit drug crimes and plant smuggling.

In all, I really enjoyed reading this book and I think it gives a thorough account of the range of cases where plants may prove critical in helping to solve crimes. A minor criticism, which is not directed towards the author, is the presentation. At first glance the book is appealing as it has an attractive bright green cover with an eye-catching yellow 'crime scene' tape stretched across it. However,

once you open the book it feels somewhat old fashioned, with lower quality cream coloured paper with black and white images scattered throughout and only four coloured plates on glossy white paper in the middle of the book. I understand in the electronic era that publishers need to compromise on cost, particularly in book such as this, which may have an avid readership but is somewhat specialised.

A key point that Gibson makes is that crime scene investigators have little botanical training and when they do decide to bring in a Forensic Botanist (of which there are very few) it may be quite late in investigation and key evidence may have been lost. The Western Australian Police are proactive in this, as every year I am involved in a forensic training course lecturing on Forensic Botany. I am only allocated an afternoon and must cover a significant amount of information (as evidenced by the breadth of content in this book!) and so I barely manage to scratch the surface. Feedback from officers is they are utterly fascinated and enjoy learning about the evidentiary potential of plants and often comment that the course has opened their eyes to new investigation possibilities at a scene. I have also seen an improvement in the way investigators photograph and collected botanical evidence at a crime scene as a result. I am pleased that I now also have a valuable resource in this book, which I can direct keen investigators to read.

Gibson rightly laments the loss of the potential pool of expert witnesses with the necessary skills in botany, as fewer students are majoring in the subject due to Botany Departments closing around the world or being subsumed into broader Schools of Biology. This book could serve as a great source of interesting content for lecturers to intrigue students – a cunning way of increasing botanical knowledge, one gruesome fact at a time.

In the News

Todd McLay's 'In the News' Column will return in the next issue. Ed.

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 John Clarkson at
editor.asbsnews@gmail.com

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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 at any time by filling in a membership application form available at <http://www.asbs.org.au/membership/>. Subscriptions become due on 1 January each year.

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Chapter conveners

Adelaide
Vacant

Armidale
Andrew Thornhill
University of New England
andrew.thornhill@une.edu.au

Brisbane
Gill Brown
Queensland Herbarium
(+617)/(07) 3199 7699
Gillian.Brown@des.qld.gov.au

Cairns
Katharina Nargar
Australian Tropical Herbarium, CSIRO
(+617)/(07) 4232 1686
katharina.nargar@csiro.au

Canberra
Alexander Schmidt-Lebuhn
CSIRO
(+612)/(02) 6246 5498
Alexander.S-L@csiro.au

Christchurch
Rob Smissen
Allan Herbarium
(+643)/(03) 321 9803
smissenr@landcareresearch.co.nz

Darwin
Ian Cowie
Northern Territory Herbarium
(+618)/(08) 8999 4511
ian.cowie@nt.gov.au

Hobart
Miguel de Salas
Tasmanian Herbarium
(+613)/(03) 6226 1806
Miguel.deSalas@tmag.tas.gov.au

Melbourne
Vacant

Perth
Vacant

Papua New Guinea
Janet Gagul
The University of Papua New Guinea
(+675) 7232 9121
gagulj@upng.ac.pg

Sydney
Peter Weston
National Herbarium of NSW
(+612)/(02) 9231 8111
peter.weston@rbgsyd.nsw.gov.au

Wellington
Heidi Meudt
Museum of New Zealand Te Papa
Tongarewa
(+644)/(04) 381 7127
HeidiM@tepapa.govt.nz

Major Australasian herbaria and systematics institutions contacts

AD
(+618)/(08) 8222 9307
stateherbsa@sa.gov.au

HO
(+613)/(03) 6226 2635
herbarium@tmag.tas.gov.au

MEL
(+613)/(03) 9252 2300
pina.milne@rbg.vic.gov.au

NSW
(+612)/(02) 9231 8111
herbarium.nsw@rbgsyd.nsw.gov.au

CANB
(+612)/(02) 6246 5084
cpbr-info@anbg.gov.au

BRI
(+617)/(07) 3199 7699
queensland.herbarium@qld.gov.au

CNS
(+617)/(07) 4232 1837
enquiry@ath.org.au
PERTH

(+618)/(08) 9219 9130
herbarium@dbca.wa.gov.au

NT
(+618)/(08) 8951 8791
herbarium@nt.gov.au

DNA
(+618)/(08) 8999 4516
herbarium@nt.gov.au

AK
(+649)/(09) 306 7060
info@aucklandmuseum.com

CHR
(+643)/(03) 321 9999
schonbergeri@landcareresearch.co.nz

WELT
+64 21 406 310
bridget.hatton@tepapa.govt.nz

Australian Biological
Resources Study (ABRS)
(+612)/(02) 6250 9417
abrs@environment.gov.au

Council of Heads of
Australasian Herbaria (CHAH)
Chair: Carlos Lehnebach
chair@chah.org.au

Australian University Herbaria Rep.:
Kristina Lemson
Edith Cown University
k.lemson@ecu.edu.au

Taxonomy Australia
taxonomyaustralia@science.org.au



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