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An interview with new *PSB* Editor-in-Chief, Carolina Siniscalchi

BSA President Jenny Xiang: Comprehending Biodiversity via Curiosity-Driven Integrative Research

FROM the EDITOR

Greetings, botanists!

I'm so happy to be writing for the first time as the new Editor-in-Chief of *Plant Science Bulletin. PSB* has been following and documenting the comings and goings of the Botanical Society of America for the last 70 years, and it feels challenging and inspiring to take on this responsibility. I hope to be in close contact with you, reader, in the next years to keep this a space where our community can get together, talk about what is going on with our membership, catch up about events, read new articles and learn more. Read more about my vision for the journal on page 4.

I am so grateful for the amazing work that the BSA editorial staff has been doing to help me transition into the role. Richard Hund, Amy McPherson, and Beth Parada, thank you so much! I also extend my gratitude to Mackenzie Taylor, *PSB*'s editor for the last 10 years, for being so patient with my many questions and guiding me through this process. I'm also grateful for Marsh Sundberg, our EIC previous to Mackenzie, who has been very welcoming in our communication.

In this volume, we have the pleasure to present the presidential address of our president, Dr. Jenny Xiang. We also have a large number of book reviews—our reviewers have been busy in the past months! I hope you enjoy and I'll see you again soon!

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https://2025.botanyconference.org

Introducing the New *PSB* Editor-in-Chief, Carolina Siniscalchi

Dr. Carolina Siniscalchi started serving as the new editor-in-chief of the PSB *in January 2025. She is an Assistant Professor and Data Science Coordinator in the University Libraries at Mississippi State University. Her main areas of botanical research interest are the macroevolution of the nitrogen-fixation symbiosis in flowering plants and the systematics and evolution of the sunflower family. She also has expertise in data science, bioinformatics, and research data management. Her strong background in systematics research and current position in library science are a unique combination that will bring new ideas and directions to the* PSB. *We welcome Carolina to this role with the following interview!*

What inspired you to pursue the Editor-in-Chief position for *PSB*?

Being a member of BSA has been such an important part of my professional life—attending Botany conferences, networking, making connections that turn into collaborations, making friends, reviewing papers for the Society's journals, being supported by travel and research awards, working as a reviewing editor for *Applications in Plant Sciences*. The list goes on and on. The possibility of giving back to the Society and contributing to this publication that is so dear to many BSA members was my main motivator. I'm so honored to carry on the legacy of our previous editor-in-chief, Mackenzie Taylor, and of all the others that came before her.

What do you like most about the *PSB*, and what features would you like to see more of?

My favorite thing about *PSB* is that it is this special place where you can catch up with everything that is happening at BSA: reports from all the different committees and representatives, the news about BSA events, updates from our student-focused programs, a lot of creative articles about all sorts of topics, and of course, the book reviews. Reading through it shows the amazing diversity of the human component of our Society and

highlights the values of our membership, besides the high-quality research done by our members. Moving forward, I really would like to see our members embracing *PSB* as the venue for dialogue among our community.

You have broad experience in botanical research, with undergraduate and graduate degrees from the Universidade de São Paulo in Brazil and post-graduate work in the U.S. In addition, you work in data science at Mississippi State University Libraries. How do you feel your background will inform the directions you'll take the *PSB*?

I think this broad scope of my professional career makes me well positioned to reach out across our field and bring different perspectives. I want to use my role as editor-in-chief to highlight the best of our membership and the truly global impact of the BSA. My current position working in an academic library requires me to keep updated on a lot of issues that are outside of research, so I hope to bring some of this perspective in as well.

The *PSB* has been around for 70 years, and it has changed a lot over that time. What do you see as the role of this publication going forward, especially as it relates to engaging the next generation of botanists and enthusiasts of plants and allied organisms generally?

I see two paths I would like to take in my time as editor-in-chief: the content side and the technical side.

Content-wise, I think we need to identify some topics that excite the community and explore focused issues on them. A great example are the two volumes on art and botany from 2024. They were so well received and shared so widely! I even saw colleagues sharing some of the articles on Instagram stories! While I have some ideas for these special issues, I would love to hear more from you, the reader, on what you would want to see on the journal. I'm planning to do a lot of outreach about *PSB* at this year's and future Botany conferences, identifying talks and posters that can be easily translated into *PSB* articles and identifying potential authors. So, expect to see me and talk to me if you are attending the conference!

Another idea I want to explore is improving the connection between some of the amazing programs that BSA runs, like Planting Science and PLANTS, with the *PSB*. For example, inviting mentees and mentors to write about the work they are developing for a *PSB* article. My vision is that *PSB* is a vehicle from the community about the community, so the more we can integrate the different aspects of BSA, the better.

On the technical side, I would like to take some actions to ensure that we are preserving the legacy of the journal and our authors. That would involve, for example, attributing DOIs (digital object identifiers, or a type of persistent identity) to the articles published in the newsletter, which would make them more easily citable and searchable online. Also, our editorial team has been discussing that it might be the time to modernize our design a bit. Hopefully we'll start on this soon!

What kinds of article submissions would you like to see in the next 5 years?

I would love to see more articles contributed by our student members. Many of our professional members mentor undergraduate students on

small research projects that sometimes do not make into publications—I would love to see some of these as articles in *PSB*. I would also love to see more articles on how plants impact our lives besides the research we do. In these few months since I started, it has been really fun finding books for review and connecting with reviewers. I would love to see some of our younger members taking the opportunity to review books too!

What benefits do you think publishing in *PSB* offers to authors, especially those that are early career?

The *Plant Science Bulletin* offers an excellent opportunity to publish articles that fall a bit outside the scope of traditional scientific journals. It offers authors a space to be creative and explore ideas or topics that they are starting to develop or that they would like to broadly communicate to our community. Feature articles at *PSB* are peer-reviewed, which helps improve the quality of our publication. For early-career authors that might not have published a lot, it is a chance to get their work out in a lower-pressure way. Because the publication is free to read and published online, their work has the potential to reach a large readership, even beyond BSA members.

If someone has an idea for an article, or a special issue, what would you advise as the next step?

If you have an idea for an article for *PSB*, the first step would be to email me at psb@botany.org. I'll be happy to discuss your idea and how it can be made into an article. You can find information about the types of articles we publish and instructions for authors at https://botany.org/PlantScienceBulletin/. I'm looking forward to hearing from you!

A Look Back at Botany Conferences with Johanne Stogran

Johanne Stogran served as BSA's Director of Conferences for 25 years, and she announced her retirement at the end of 2024. Johanne (along with her family) was central to why Botany conferences have earned the reputation as being friendly, welcoming, and exciting. We asked Johanne to look back on her career with the BSA and share her thoughts.

Let's start at the end. Your 25th and final conference was in Grand Rapids, MI in 2024. How were you feeling as things were wrapping up?

It was really bittersweet! I have absolutely loved this job, but it was time for something new. I was deeply honored by all the best wishes I received at the conference.

How have the conferences changed over the years since you started in 2000?

The very basics of the conference have not changed that much. Our major mission is to give anyone who wants it (with a submitted abstract)—their 15 minutes of "fame" as they present their research or ideas to their peers. The challenges come from the costs of being able provide a quality product while keeping the conference affordable for attendees. We have come a long way from the days of printing the program and abstract books in a looseleaf binder! Now most everything is online and with a robust app.

Johanne and Kevin on a site visit to Alaska, standing on a frozen lake.

Oh, the places we got to go… not only where the conferences were held but all the site visits! Finding just the right place to host our famed Botany conference. Most of the places were good, and some not so good! But the conference always received high marks from the majority of attendees. I think our attention to membership satisfaction has always been reflected in the post-conference survey results.

We have gathered on college campuses, large cities, smaller cities, conference centers, convention centers, big hotels, and resorts—from mountain tops to deserts, botanical interests are everywhere! Most importantly, we always met where we could get the most bang for our buck. Oh, and then there were the years we all met at our own desks during COVID.

The conference has always been a very welcoming and supportive place for all, especially to include the PLANTS students, AISES, and other programs. Over the years it has been great to watch as young, nervous undergraduates come to their first conference to present their paper or poster, wanting it to all go well. They come back in the following years full of confidence and knowledge, and then a few years later they bring their own nervous undergraduates with them!

What goes into preparing a conference? What kind of behind-the-scenes issues are you dealing with throughout the year prior to the conference?

There are so many aspects of the conference. Most of it is behind the scenes. There is the city, the venue, the hotels, exhibitors, and vendors to handle—with so many pieces and parts that all need to be coordinated concerning food and beverage—so that by the time everyone arrives on site, it is one well-oiled machine. Hopefully all the details make for an enjoyable experience for all attendees.

And there are lots and lots of emails! My focus has always been on customer service to our membership, and it has truly been my pleasure to help attendees with all aspects of how to attend: the inability to meet deadlines, clarity on how to submit abstracts, and re-direction when they wanted to do an oral presentation—but submitted a poster instead! And a variety of other problems we can address. I remember one person that was having a lot of trouble as a young student, and he was very grateful after I helped him. I jokingly said, "Just remember us when you are rich and famous!" I think he is now a lifetime member!

How key is the Botany Conference Program Director in your planning? You've worked with Melanie Link-Perez, Amy Litt, David Spooner, Karen Renzaglia, and Jeff Osbourn over the years.

We are a team! The Program Director organizes the content and decides on the pieces of the program. It was my job to figure out the logistics and to make it all happen. I was very fortunate over the years to work with some amazing people… and now we will be friends forever!

What was one of your most challenging conferences and why?

By far, the most challenging was Alaska in 2022. Getting to the hotel and not feeling well, only to find out that both my husband Kevin and I had COVID! Running the conference from a hotel room was not fun, along with the pressure on my family members (Kathryn, Jessica, Jamie, and Steve) as well as the BSA staff to do everything for me.

And then there were the COVID years in 2020 and 2021. Nobody knew what to do, so we really had to re-invent the wheel. Contracts for the cities we were scheduled to be in had to be renegotiated in order to not lose money. Companies popped up offering online conference services and platforms, but we had to find the right one that would help us preserve the culture of our conference. We got through 2020 pretty successfully and thought we were done… only to do it again in 2021! It was great to be back to normal in Anchorage (well, for most of you!).

Beyond the challenges, what are some of your best memories?

So many great memories, and so many great people. It has been one of the great pleasures of my life to have had this position!

Your family has always been key to smoothly run conferences. Would you like to give some shout-outs to them?

They were always on site in addition to the BSA staff and their families, working overtime throughout the week. I had an additional cast of characters—my amazing family!

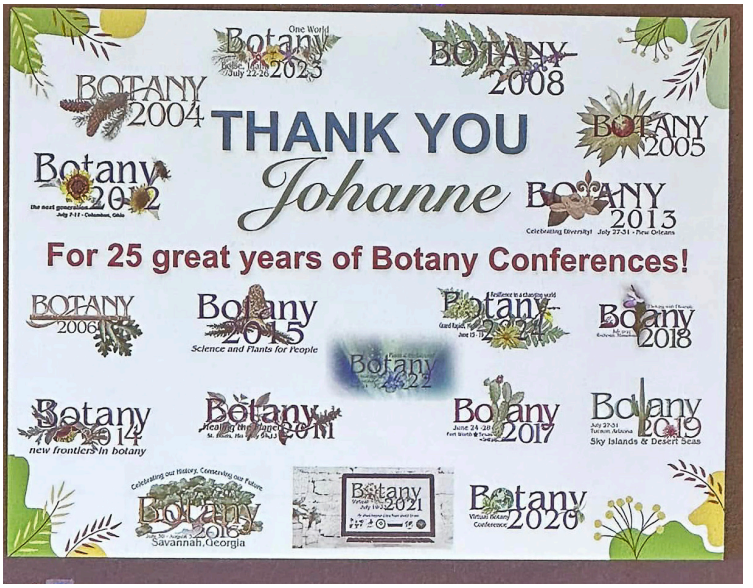
I definitely could not have done this without the support of all of them. They were always there to do whatever was needed both on site and before the conference! Four of our five children have worked various Botany conferences. Some started when they were just teenagers and stuck through the end---but even those marrying into the family were pressed into duty, like Steve Bornhoeft serving as our tech guru! And then there is Kevin. He

Celebrating 25 years! Thank you Botany!

was kind of the glue that held it all together on site, keeping meticulous track of everything and posting all those directional signs. The conferences would have never been successful without them!

Any final thoughts?

Kevin and I are planning to do more traveling, and we have gardens to plant! Eight (and one on the way) grandchildren to hug and spoil! Lots to look forward to!



Twenty -five years of Botany conference logos designed by Johanne.

WELCOME TO THE NEW BOTANY CONFERENCE COORDINATOR, LORI STRONG

In light of Johanne Stogran's retirement from BSA as Conference Director, the Society has selected Lori Strong, the Senior Meetings Director for Burk & Associates in Herndon, VA, to coordinate the Botany 2025 conference! Burk & Associates partners with member-based societies such as the BSA to provide overall conference management including location selection, venue and vendor contracts, registration, and on-site management. Lori and her team have been working closely with Heather Cacanindin, BSA Executive Director, and Melanie Link-Perez, Program Director, to provide a great conference experience. Lori can be reached at lstrong@burkinc.com.

Meet the 2025–2027 Early Career Advisory Board!

The Botanical Society of America's Early Career Advisory Board (ECAB) is made up of senior graduate students and postdocs who engage with and advise the editors of the *American Journal of Botany*, *Applications in Plant Sciences*, and the *Plant Science Bulletin*. They do this in a number of ways, including recommending timely topics for review papers and special issues; sharing questions and advice on peer-review and manuscript preparation; and advising on broad issues of importance to early-career researchers and the publications team. To learn more, see https://botany.org/home/publications/ecab.html.

- **Lucas Albano**, North Carolina State University
- **Ana Andruchow-Colombo**, University of Kansas
- **Gwen Bode**, University of Georgia
- **Zoë Dennehy-Carr**, University of Florida
- **Vikas Garhwal**, Indian Institute of Science Education and Research (IISER) Kolkata, India
- **Kaleb Goff**, North Carolina State University
- **Matias Köhler**, Universidade Federal do Rio Grande do Sul (UFRGS), Brazil
- **Elton John de Lírio**, University of São Paulo, Brazil
- **Erika Moore-Pollard**, University of Memphis
- **Yannick Woudstra**, Stockholm University, Sweden
- **Andrea Romero**, University of California, Riverside
- **Muhammad Shahid**, Pir Mehr Ali Shah Arid Agriculture University Rawalpinid (PMAS-AAUR), Pakistan; Iowa State University

Research Data Sharing in 2025: What You Need to Know

Those of us who have written for or been part of a grant from a U.S. federal funding agency, such as the National Science Foundation (NSF), National Institutes of Health (NIH), or U.S. Department of Agriculture (USDA), in the last decade have faced the requirement of submitting a data management plan (DMP) with the grant proposal. The DMP lays out the plans for data preservation during and after the grant period, including plans to share data publicly. While this document can sometimes be overlooked as another item in a long list of requirements to submit a grant, it stems from regulations put in place by a federal agency called the Office of Science and Policy Technology (OSTP), which has an advisory role to the federal administration.

In 2013, the then-director of OSTP published a memorandum that started to lay out the plan to promote public sharing of data and publications generated with federal revenue. A permanent link to this memo is found here: https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf. In 2022, the OSTP released an update to this memo (which is commonly referred to as the Nelson Memo), expanding some of the sharing and public access requirements. The goal of the Nelson Memo is to provide free, immediate (without embargo), and equitable access to research that is federally funded. This is grounded in how the quick and widespread sharing of data and scientific research during the COVID-19 pandemic led to significant advances in some areas and thus proposes further expanding data sharing requirements. You can read this memo at https://bidenwhitehouse.archives.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Memo.pdf.

The main takeaways of the 2022 memo are: data produced as a result of grant funds should be made publicly accessible immediately upon publication or at the end of the grant period; and publications should be publicly accessible immediately upon publication. There are further details about persistent identifiers, like ORCID. The memo set December 2024 as the deadline for agencies to present their public access plans, and December 2025 as the implementation deadline. As expected, most agencies (including NSF and USDA) released their plans to comply with these new requirements late last year.

NSF released a draft for comments of their new Proposal & Award Policies & Procedures Guide (PAPPG) last December. The main changes in data and publication sharing in this draft document are that data sharing and management plans will not have a page limit anymore; they will be submitted through a specific web application (still not released); research data and publications are expected

By Carolina M. Siniscalchi
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to be made freely available upon publication; and research products should have a retention time of at least two years. No specifications are made about where data should be deposited, leaving it up to the researcher to decide the place where the data will be more likely to be discovered and used. We should expect a definitive version of the PAPPG later this year. The main changes for USDA projects are the establishment of dedicated data and publication repositories: Ag Data Commons and PubAg.

One important point to notice is that even though the new requirements mention that publications should be available immediately upon publication, this does not imply that authors need to pay for open access publication fees. If they decide to go this route, they can budget publication costs within grants. However, for the sake of federal requirements, green open access, or self-archiving, is allowed. For those unfamiliar with the concept, green open access consists of depositing an author-approved copy of a manuscript (usually the post peer-reviewed manuscript, without any journal-specific formatting) in a public or institutional repository, if allowed by the publisher. A brief introduction can be found here: https://open-access.network/en/information/open-access-primers/green-and-gold.

It is not easy to predict what will happen with the OSTP and funding agencies' public access policies with the upheaval the U.S. is going through right now. I personally think it is important to be prepared to implement open and public access changes to our research workflows independently of federal requirements, since sharing data allows for better research practices in terms of community oversight and shared knowledge and progress. If you are feeling lost and confused about this topic and want more information, look up the research data librarian or the scholarly communication librarian at your university's library (specific job titles may vary). These folks keep a close eye on publication and data developments and can help guide you through writing data management plans, finding repositories, and investigating open access options. As a data librarian myself, I'll do my best to keep the BSA community informed about new issues as they develop.


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AMY LITT
MARCELO A. AIZEN
AARON DAVID

Comprehending Biodiversity via Curiosity-Driven Integrative Research to Aid Conservation and Identify Resilience to Climate Change

Address of the Incoming BSA President

This article by BSA President Qiu-Yun (Jenny) Xiang is based on her BSA Incoming President Address at Botany 2024.

Mounting evidence indicates that biodiversity is being negatively impacted by global changes brought on by human activities. Studies have shown that elevated CO_2 levels, climate warming and drought, and intensified land use interactively reduce biodiversity and alter or degrade ecosystem functions. The role of biodiversity in promoting ecosystem functioning and in regulating responses to global changes has been demonstrated in empirical studies (Hong et al., 2022; Zhang et al., 2023).

By Qiu-Yun (Jenny) Xiang

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Conservation of biodiversity requires a global effort and must be multi-trophic and scaled to sustain ecosystem functions and services. Biodiversity (the total variation of life in space and time embodying various dimensions, e.g., taxonomic, functional, phylogenetic, and genetic; Willig and Presley, 2013) is the outcome of evolution over time in response to past environmental variation and changes. The Earth's current biodiversity is the evolutionary outcome of past biodiversity and will evolve to become future biodiversity in response to current and future environmental changes and variation (Prisco and Convey, 2012). Understanding the origin and evolution of biodiversity, its spatiotemporal patterns, and the governing processes and drivers is, therefore, essential for conservating present biodiversity and predicting future biodiversity.

Specimen collections and big data-based integrative studies of biodiversity across taxonomic hierarchies at regional and

continental scales hold great promise for helping us understand spatial biodiversity patterns and identifying areas of resilience as priorities for conservation. For example, Lu et al. (2023) integrated species richness and phylogenetic diversity with distribution data to evaluate the spatial diversity patterns of flowering plants in China. They (Lu et al., 2023) identified 42 areas that hosted 97.1% of species richness (23,394/24,095), 96.5% of endemic species (11,841/12,274), 100% of threatened species (2613/2613), and 99.3% of the phylogenetic diversity for flowering plants involved in the study. Forty-four percent of the species and 95.7% of the genera native to China were included in the phylogeny. The areas covered only 13.3% of China's land area. Their findings have provided a valuable framework for planning the establishment of national park protection system in China.

Another example is the study by Tordoni and colleagues (2024) that integrated the biodiversity of seed plants worldwide across three dimensions—species richness, phylogenetic diversity, and functional diversity—to develop an integrative μ-diversity index that is more sensitive in describing species diversity patterns. By assessing the biodiversity of different dimensions and μ-diversity and assessing relationship between plant μ-diversity and environmental, historical, and anthropogenic data, the authors (Tordoni et al., 2024) identified biodiversity-rich areas/countries and determined that climate variability and actual evapotranspiration were the most important determinants of μ-diversity and individual diversity. They concluded that historical climate stability and water-energy dynamics strongly affect species diversity. In another example, Anderson et al. (2023) integrated comprehensive information from biodiversity, diversity of connected topoclimates, human impacts, and diversity of geophysical settings to construct a connected network of land covering 34.5% of the conterminous United States for conservation. The network is to provide resilient habitat for species while supporting dynamic shifts in ranges and changes in ecosystem composition to sustain biodiversity under a changing climate.

From an evolutionary perspective, landscapes need to allow in situ natural selection and capture high levels of genetic variation essential for responding to the direct and indirect effects of climate change (Sgro et al., 2011). At a small scale, comparative studies on the evolution of individual species and their properties can reveal evolutionary resilience, for example, high genetic diversity, adaptive genetic diversity, adaptive functional traits, and ongoing evolutionary processes and drivers that ensure the ability of populations to persist in their current state and to undergo evolutionary adaptation in response to changing environmental conditions (Sgro et al., 2011). Such knowledge is invaluable for conserving the taxa studied and the communities they inhabit. That knowledge provides baseline information for large-scale ecological analyses and modeling and for potential engineering of ecosystems so that they can maintain sustainable services. Genetic diversity, evolutionary trajectories of species, populations, adaptive traits, and evolutionary processes not only affect the persistence of species, but also influence community ecology and ecosystem function. Integrative studies of 'model clades' (arenas within which detailed studies, undertaken from multiple angles; Donoghue and Edwards, 2022) spanning infra- and interspecific levels across disciplines can shed light on the

capacity and potential of a species and its relatives to persist during extreme climate events. Detailed studies of populations and species of 'model clades' from multiple angles can reveal potential critical traits, genes, or genetic components, and the evolutionary and ecological processes for surviving in adverse conditions. The information obtained can be applied to models to predict whether a particular community can sustain changing environments and provide information on what species or taxa to select for restoring the function of a diversity-depleted community. Small-scale studies provide the data to allow for more accurate predictions of changes in the distribution of species under climate changes through more sophisticated modeling incorporating functional traits. Multi-faceted data from many 'model' clades will also permit refined evaluations of spatial patterns of biodiversity from previous large-scale analyses that were constrained by various aspects, such as missing data, incomplete species sampling, inconsistent species delineation, and/or limited knowledge of the properties of individual species and their interactions with each other and so forth.

Under a phylogenetic framework, comparative analyses of biological properties and environmental variables of habitats of the species in the 'model clades' can reveal how changes in specific properties evolved over time and perhaps what their associated biotic and abiotic drivers were. Traits and genes resilient to past climate and other environmental changes may be identified. Such information is similarly valuable for conserving the taxa studied and the communities in which they occur. As species and communities evolve in response to a changing climate, how they and their communities evolved in the past will inform us of the direction they are likely to take in the future.

One may declare a species or species group to be a 'model' based on multifaceted studies driven by curiosity and funding. Curiosity is the great incentive that drives integrative studies. It can be stimulated in many ways—from reading the literature, attending conference presentations and seminars, experimental results, observation in the field, and questions raised by colleagues and students. Organisms we see in nature may plant the seed of curiosity in the heart, motivating questions about what they are, what they do, what roles they play in the ecosystem, and how they connect and interact with each other and with other species. Such curiosity easily drives novel research beyond traditional fields, fostering deeper understanding through collaborations and through interdisciplinary approaches.

For example, when seeing species producing large white inflorescences and small flowers frequently growing together and overlapping in blooming times in the same location (Figure 1), one may wonder what makes them converge on this morphology and phenology? Is there a common developmental, genetic, and chemical basis for such behavior? Do they compete for pollinators? Is it possible that one may mimic the other for some unknown survival benefit? How does their blooming time vary with climate change? What microbes and animals interact with these species? How different are they in secondary metabolites? In flowers? In vegetative parts? Is their genetic makeup or the environment more important in determining the metabolites they produce? What will happen if these plants are removed from the community?

Figure 1. Achillea millefolia *L.*, Daucus carota *L.*, Cornus amomum Miller, Sambucus canadensis *L. (Photos by Jenny Xiang.)*

When seeing interesting venation patterns in a plant (Figure 2), one may wonder if this pattern also occurs in other species. How are venation patterns related to leaf function and resilience to climate change? To what extent does venation structure in a community predict the function of an ecosystem? How many kinds of venation patterns have evolved in flowering plants, and how are they mapped onto angiosperm phylogeny? What drives an evolutionary change in venation patterns, and how much do we know about the genetic control of vein patterning? And finally, which of these questions have been addressed in previous studies?

Figure 2. Glechoma hederacea *L. (Photo by Jenny Xiang.)*

Curiosity-driven research is fun and self-motivated for both PIs and students. One can integrate data from development and molecular genetics over a phylogeny to search for the ontological and molecular bases of structural evolution. For example, a former graduate student's curiosities about genetic changes leading to the evolutionary divergence of inflorescence types in the *Cornus* L. (dogwood) clade (Figure 3) motivated our multidisciplinary studies of representative species that integrated evolution, development, gene expression, and gene functional analyses via collaborations. Those studies revealed evolutionary changes in the morphology of the early development of inflorescences and the expression of candidate genes controlling the morphology that determine the framework of different architectures (head, condensed compound dichasia, umbel, and elongate compound cymes) (Feng et al., 2011; Liu et al., 2013, 2016, 2019; Ma et al., 2017). We derived a *TFL1* (*Terminal Flower Locus 1*) and *AP1* (*APETALA1*) homologous gene-based model to explain the variation in inflorescences in *Cornus* (Ma et al., 2017), which offered a hypothesis for testing in other flowering plant groups with determinate inflorescences.

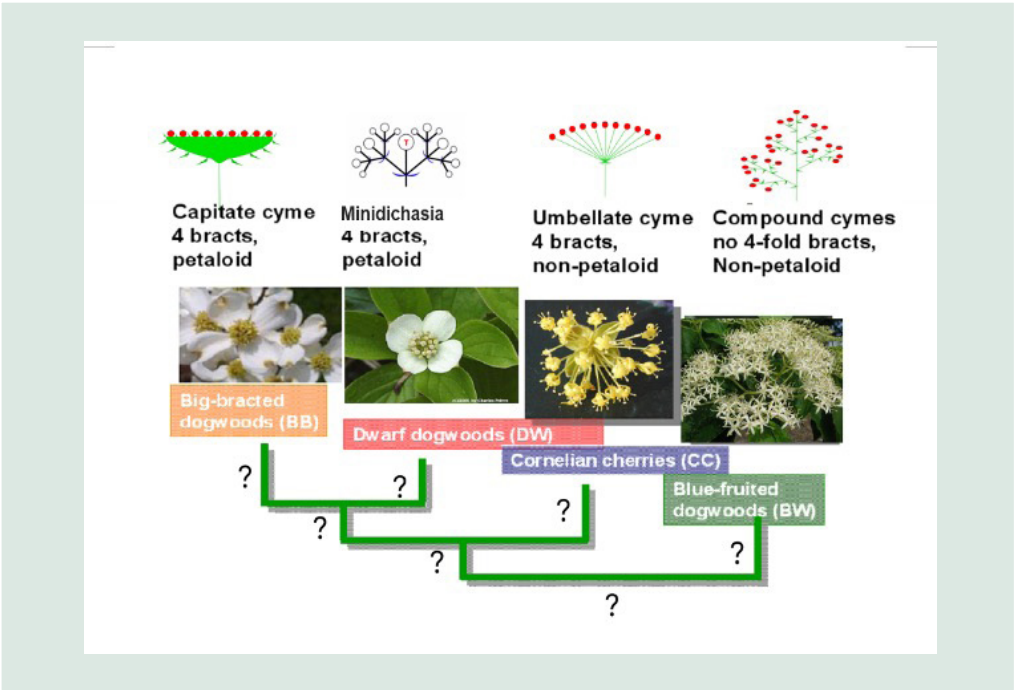

Figure 3. *Inflorescence types characterizing four subclades of* Cornus L. *(Modified from Ma et al., 2017).*

Many more studies are needed to fully understand the genetic network and environmental factors regulating the development of inflorescences in *Cornus*. Another interesting and important aspect that needs to be studied is the ecological and evolutionary impact of changes in inflorescence architecture in response to climate change in closely related species.

We also had fun in multidisciplinary studies of the tree, *Cornus florida* L. (flowering dogwood; Figure 4) via collaborations driven by curiosities of the genetic diversity in response to the threat of fungal diseases; changes in distribution in response to global warming; local adaptation; and genes, metabolites, and microbes that may be associated with disease resistance. We used tools from population genomics, evolutionary ecological genomics, metabolomics, and metagenomics to gain knowledge on these aspects (Call et al., 2015, Pais et al., 2017, 2018, 2020, 2024). We identified candidate loci selected by nature for adaptation to local abiotic environments, including temperature changes, secondary metabolites and genes likely associated with immunity to threatening fungal diseases, and foliar microbe diversity interacting with the species and differences of microbial communities between plants in visually healthy and diseased sites.

One can undertake many studies driven by curiosity to collect data from different layers for the species in a focal clade to provide baseline information for large-scale analyses. However, linking information across layers is essential for acquiring a comprehensive understanding of biodiversity and identifying factors regulating responses to environmental change. Although it remains challenging, comparative analyses over phylogenetic frameworks offer one way for connecting information across layers and

Figure 4. Cornus florida *L. (photo by Jenny Xiang).*

between traits of the same layer to reveal potential causal biotic and/or abiotic factors driving evolution. For example, Thorson and colleagues (2023) integrated methods from comparative phylogenetic analyses and structural equation models to identify direct and indirect associations among 35 continuous and categorical traits representing life history, reproductive, morphological, and behavioral features for all (>32,000) described fishes worldwide. Their findings suggested that a one-degree Celsius increase in the environment was associated with an average 3.5% increase in natural mortality.

By integrating data from climate, distribution, and soil nutrients, evolutionary changes in functional traits, genetic network, and molecular changes that are associated with abiotic factors can be identified within clades through phylogenetic mapping and association analysis. Key evolutionary changes in networks at different layers may be inferred. Those occurring on the same branches can be connected to provide comprehensive and 'hierarchical' information for developing integrative mathematical models to predict the effects of property changes in lower (micro-) layer on the connected properties of higher (macro-) layers or micro changes underlying observed macro changes (Cavigelli et al., 2021). Models are an important way to reintegrate our understanding of how molecules, cells, organs, organisms, populations, and ecosystems function (Dornhaus et al., 2021). To foster mathematical modeling integrating multifaceted data for complex biological systems, collaboration between biologists, mathematicians, and computer programmers is needed and a workforce with interdisciplinary background and skills need to be trained (White et al., 2021).

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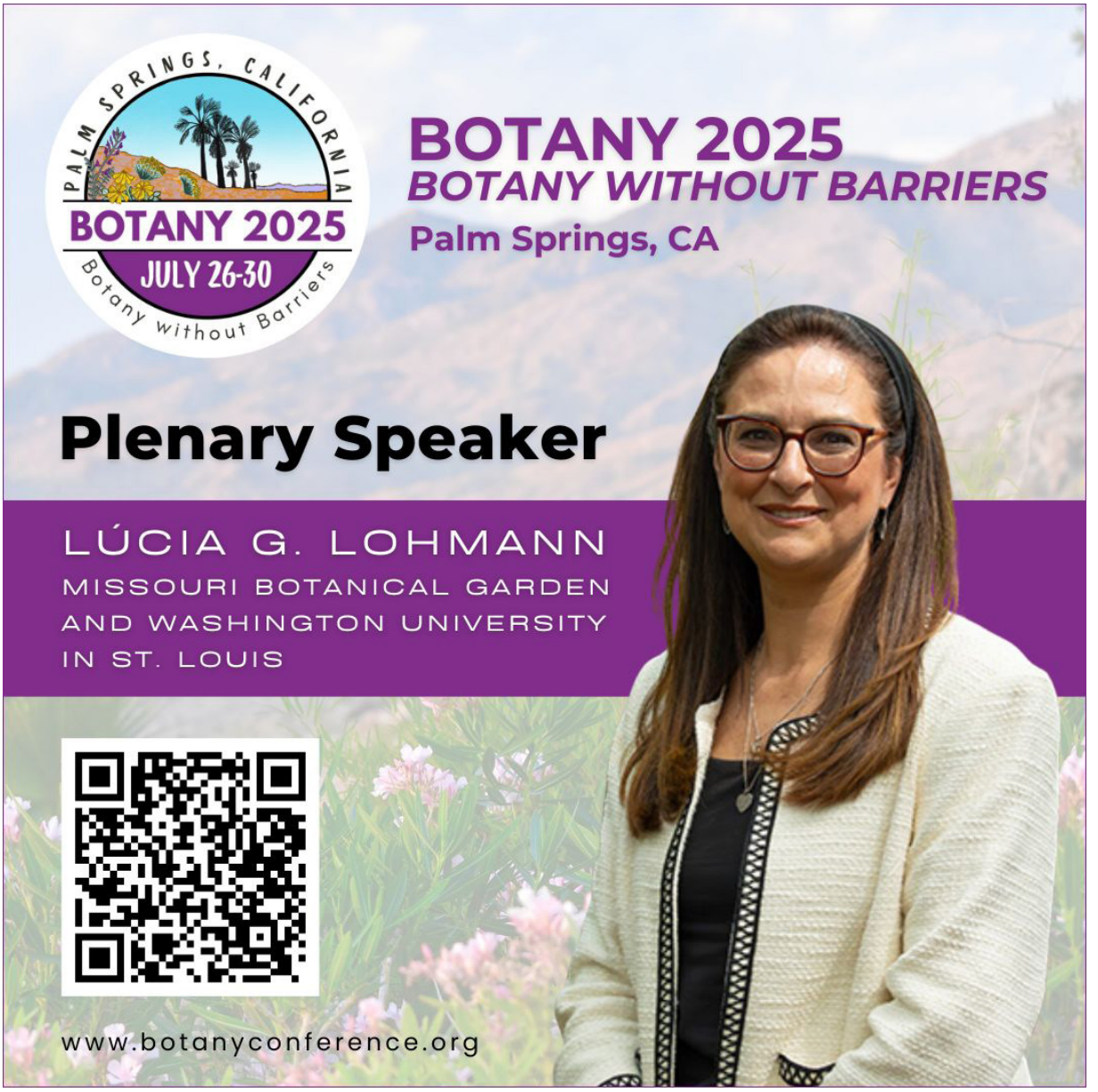
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MEMBERSHIP NEWS

Botany360 Updates

Botany360 is a series of programming that connects our botanical community during the 360 days outside of Botany Conferences. The Botany360 event calendar is a tool to highlight those events. The goal of this program is to connect the botanical science community throughout the year with professional development, discussion sessions, and networking and social opportunities. To see the calendar visit www.botany.org/calendar. **If you want to coordinate a Botany360 event, email aneely@botany.org.**

Recent Botany360 event recordings:

- **NFS Workshop for GRFP 2024** (September 26, 2024) https://www.youtube.com/watch?v=uSVp279V7w0
- **Applying to Grad School 2024** (October 3, 2024) https://www.youtube.com/watch?v=la0z9yVu6n8
- **Prepping for PLANTS: An Informational Webinar about the PLANTS Travel Awards for Underrepresented Undergrads** (January 24, 2025) https://www.youtube.com/watch?v=wI-F6Kbu0XM

By Amelia Neely

BSA Membership & Communications Manager

E-mail: ANeely@botany.org

BSA SPONSORSHIP OPPORTUNITIES

Do you know a business or organization that would benefit from being in front of over 3000 botanical scientists from over 70 countries, and over 48,500 followers on social media? The BSA Business Office has many opportunities for sponsorship including:

- Sponsored *Membership Matters* newsletter articles and footer ads
- BSA website banner ads
- Hosting Botany360 events
- Botany360 event logo advertisement during event, a slide before/after event, or time to discuss product at beginning or end of event
- Sponsored social media ads
- Advertisement space in the *Plant Science Bulletin*

Because we value our community, the above opportunities are limited with the hope of being informative without being intrusive. Sponsorships will allow BSA to fulfill our strategic plan goal of being financially responsible during this time of economic shifts.

To find out more about sponsorship opportunities, email bsa-manager@botany.org.






BSA SPOTLIGHT SERIES

The BSA Spotlight Series highlights **early-career and professional scientists** in the **BSA community** and shares both scientific goals and achievements, as well as personal interests of the botanical scientists, so you can get to know your BSA community better.

Here are the latest Spotlights:

- **Adam Abdullahi**, Graduate Student, University of Pennsylvania https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/adam-abdullahi.html
- **Benjamin Ajayi**, Graduate Student, Florida State University https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/benjamin-ajayi.html
- **Vikas Garhwal**, Graduate Student, Indian Institute of Science Education and Research Kolkata, India https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/vikas-garhwal.html
- **Nora Mitchell**, Faculty, University of Wisconsin - Eau Claire https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/nora-mitchell.html
- **Dennis Wm. Stevenson**, Faculty, New York Botanical Garden https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/dennis-wm-stevenson.html.
- **Naomi Volain**, Cartoonist, Self-Employed https://botany.org/home/careers-jobs/careers-in-botany/bsa-spotlight-series/naomi-volain.html

Would you like to nominate yourself or another BSA member to be in the Spotlight Series? Fill out the form at https://forms.gle/vivajCaCaqQrDL648.

PlantingScience's Spring 2025 Session is Underway!

The Spring 2025 session of PlantingScience kicked off on February 10, bringing together students, teachers, and mentors for another exciting season of plant science exploration. This session, we are working with 17 dedicated teachers from across the United States, supporting 26 class periods and approximately 120 student teams.

Students are investigating a variety of themes, including seed germination, food production, potato soft rot, and genetic expression under different environmental conditions. These projects provide hands-on learning experiences that deepen students' understanding of plant biology and scientific inquiry.

None of this would be possible without our incredible liaisons and mentors, who are guiding students as they develop their projects and explore new scientific concepts. Their support and expertise are invaluable to the success of this program.

The current session will run until April 30. Stay tuned for our Star Projects announcement, where we will highlight some of the most outstanding student research from this season!

Thank you to everyone involved in making this session a success!

By Dr. Catrina Adams, *Education Director*

Jennifer Hartley, *Education Programs Supervisor*

The Community of the BSA

With the new administration threatening diversity, equity, inclusion, and access initiatives, scientific funding, and resources in the U.S., we want to remind our student members that the BSA is here for you. There is immense power in community, and we remain committed to fostering an inclusive global network that advances botanical science for the benefit of people and the environment. Scientific funding and infrastructure are critical to that mission.

That said, many of us are grappling with the question of what we can do to fight back. There's no one-size-fits-all answer, but if you have the bandwidth, consider joining or starting advocacy groups at your institution, calling your representatives, and, most importantly, picking one local action and following through. Small steps matter.

By Josh Felton and
Benjamin Aderemi Ajayi
BSA Student Representatives

STUDENT BOTANY 2025 TASTER

The Botany conference is just around the corner, and we can't wait to see you in Palm Springs! Keep an eye on your email in the coming months for details on our Botany360 event in May: *Make the Most of Botany2025: A Student Conference Guide.* Don't miss it!

Conference at a Glance

Here's a summary of the conference schedule:
Saturday, July 26 – Sunday, July 27: Field Trips

Sunday, July 27: Workshops, Plenary Lecture, All Society Mixer

Monday, July 28: Poster Session

Monday, July 27 – Wednesday, July 30: Oral presentations and events

Wednesday evening, July 30: Conference-wide celebration!

STUDENT-CENTERED EVENTS

Join us for the many student-centered conference events, including a workshop, a Careers in Botany Panel, a Student Social, and a Student Chapter Meet-up:

Make sure to come to our Botany360 event (https://botany.org/home/resources/botany360.html) to hear about the following items:

- General Conference Tips
- Budgeting for the Conference
- Volunteer Opportunities at the Conference
- Presenting at the Conference
- Networking Tips

FURTHER READING AND ADVOCACY

If you are feeling lost in all of the political news, consider subscribing to the newsletter *Making Sense of it All,* which provides weekly updates on the state of science and higher ed in the U.S.

https://buttondown.com/liminalcreations

If you are interested in science communication, consider writing an opinion piece for your local or hometown newspaper. Science Homecoming's goal is to encourage scientists to return to their hometowns by writing brief opinion pieces in their local newspaper, advocating for investment in American science.

https://sciencehomecoming.com/

Finally, if you are interested in talking points regarding advocacy or want a template of a message to send to your representatives, check out this document from the American Institute of Biological Sciences.

https://aibsorg-my.sharepoint.com/:w:/g/personal/jpandey_aibs_org/EQ4DLGZBHVpCjIGj27DgsCgBbe-IFWmNpJasldPLBaCELQ?rtime=9U5wK6Zg3Ug

Feel free to reach out to us on BlueSky @botanyballer.bsky.social and @ajayibenmi.bsky.social or via email feltonjosh@icloud.com and aderemibenjamin@gmail.com if you have any questions or comments about how our Society can best support you.

ANNOUNCEMENTS

IN MEMORIAM

RICHARD ALAN WHITE (1935–2024)

Richard Alan White ("Dick"), a long-time professor of botany at Duke University, died peacefully on August 10, 2024 at home, surrounded by his family. He was 88. Dick was a plant anatomist, especially interested in the vascular anatomy of ferns.

Dick was born on October 25, 1935, to Alpheus Rayburn White and Katharine Eleanor (Mullaney) White. Born and raised in Philadelphia, he attended the local public schools and graduated from John Bartram High School in 1953. During those years he spent considerable time "botanizing" in the famous Bartram's Garden.

He received his undergraduate and master's degrees from Temple University and was the recipient of a city scholarship. He credited Temple's Don M. Benedict with stimulating his interest in botany, which continued during subsequent years at the University of Michigan. Dick received his doctorate degree from the University of Michigan under a Danforth Scholar Foundation Fellowship; his doctoral committee chairman was Dr. Charles B. Beck. His dissertation topic, a comparative study of fern xylem elements, was influenced by a course with Dr. Warren H. Wagner, Jr. with whom he travelled to Hawaii as a field assistant in the summer of 1961. This was his introduction to the field collection of tropical ferns, which became a major part of his later research activities.

His dissertation in 1962, *A Comparative Study of the Tracheary Elements of the Ferns,* led to several early publications. His first publication, while he was still a student, reported for the first time the existence of vessel members in the water fern *Marsilea* (White, R. A. 1961. Vessels in roots of Marsilea. *Science* 133: 1073-1074).

Following his graduation from Michigan, Dick spent a post-doctoral year at the University of Manchester, England, sponsored by a National Science Foundation award. There, he worked in the laboratory of C. W. Wardlaw, where he explored the more experimental and developmental aspects of fern morphology. Other early publications resulted from this work.

In 1963 he accepted a position as Assistant Professor of Botany at Duke University, where he spent his entire professional career. He rose to the rank of Professor of Botany and served two terms as Chair of the Department of Botany.

Dick was an award-winning teacher who found joy and fulfillment in teaching at both the undergraduate and graduate levels. He was known for his "hands-on" Plant Anatomy lab course where students learned paraffin microtechnique and completed individual research projects. He also enjoyed teaching non-major students a "Plants and Humans" course.

Over the years at Duke, Dick maintained an active research program. Numerous graduate students received their advanced degrees under his guidance. His students worked on a diversity of projects, including topics beyond pteridophyte anatomy. Topics ranged from peristome development of mosses to floral development of Zingiberales, from tree fern anatomy to systematics of Haemodoraceae. Dick's own research focused primarily on the anatomy of tree ferns.

Beginning in the late 1960s, Dick's interest in the anatomy of tree ferns resulted in numerous research trips supported by the National Science Foundation and Duke University, which included travels to Hawaii, Costa Rica, Venezuela, Juan Fernandez Islands, New Zealand, New Caledonia, New Guinea, Malaysia, St. Helena, and the Galapagos. He was often accompanied by student field assistants and his cousin Bob Soeder.

Live tree fern specimens that he collected are growing at The Atlanta Botanical Gardens and the Daniel Stowe Botanical Gardens in Belmont, NC; preserved material has been deposited at The New York Botanical Gardens and the Duke University Herbarium.

Dick White in 1976 with the rare Juan Fernandez endemic Thyrsopteris elegans.

Dick's studies primarily examined shoot vascular patterns of ferns, focusing on the stelar ontogeny of young sporophytes. Salient publications include:

- McAlpin, B. W., and R. A. White. 1974. Shoot organization in the Filicales: the promeristem. *American Journal of Botany* 61: 562-579. While initially somewhat controversial, McAlpin argued that fern apical meristems are complex, zoned structures comparable to the meristems of seed plants, downplaying the earlier focus on the single apical cell and its derivative segments. In 1977, Bierhorst criticized this and similar studies, reaffirming the traditional importance of apical cells in fern meristems. In 1995, White and Turner concluded that fern meristems are both histologically zoned and have apical cells and regular segmentation and suggested that the opposing views emphasized different real aspects of the same structures.

- White, R. A. 1979. Experimental investigations of fern sporophyte development. In: A. F. Dyer (Ed.). The Experimental Biology of Ferns, 505-541. Academic Press, London.

- White, R. A. 1984. Comparative development of vascular tissue patterns in the shoot apex of ferns. In: R. A. White and W. C. Dickison (Eds.). Contemporary problems in plant anatomy, 53-107. Academic Press, New York. Dick proposed that complex protoxylem systems of fern steles reflect underlying similarities with seed plant eusteles.

- White, R. A., and M. D. Turner. 1988. *Calochlaena*, a new genus of dicksonioid ferns. *American Fern Journal* 78: 86-95. Described a previously overlooked genus-level clade within the tree ferns.

- White, R. A., and M. D. Turner. 1995. Anatomy and development of the fern sporophyte. *The Botanical Review* 61: 281-305.

- White, R. A., and W. H. Weidlich. 1995. Organization of the vascular system in the stems of *Diplazium* and *Blechnum* (Filicales). *American Journal of Botany* 82: 982-991. Dick suggested that fern dictyosteles were in some ways comparable to seed plant steles.

Dick continued to publish in retirement as emeritus:

- White, R. A., and M. D. Turner. 2012. The anatomy and occurrence of foliar nectaries in *Cyathea* (Cyatheaceae). *American Fern Journal* 102: 91-113. This study reported the widespread occurrence of foliar nectaries in the genus *Cyathea*.

- Kao, T, K. M. Pryer, M. D. Turner, R. A. White, and P. Korall. 2015. Origins of the endemic scaly tree ferns on the Galápagos and Cocos Islands. *International Journal of Plant Sciences* 176: 869-879. Documented the independent origins of the four island *Cyathea* species from different mainland ancestors.

Dick's last publication combined his long-standing interests in tree fern anatomy and anatomy of young sporophytes:

- White, R. A., and M. D. Turner. 2017. The comparative anatomy of *Hymenophyllopsis* and *Cyathea* (Cyatheaceae): A striking case of heterochrony in fern evolution. *American Fern Journal* 107: 30-57. The origin of "*Hymenophyllopsis*" from typical *Cyathea* ancestors involved a drastic reduction in size and complexity, coupled with the precocious production of spores. This is an example of paedomorphosis; adult *Hymenophyllopsis* plants as precociously fertile, permanent "young sporophytes" of tree ferns.

In recent years, Dick worked to complete a long-term project of his: a biography of F. O. Bower, the influential British pteridologist of the late 19th and early 20th centuries. This manuscript is expected to be published.

He spent sabbatical years in Dunedin, New Zealand and Edinburgh, Scotland, as well as in Cambridge and Durham, England.

Dick was appointed Dean of Duke's Faculty of Arts and Sciences and Dean of Trinity College in 1985, and in 1990 he also became the Vice Provost for Undergraduate Education, serving in these roles until 1997.

In 1999 he became the Executive Director of Sarah P. Duke Gardens and helped continue the gardens' development. In 2000, Dick was appointed University Marshal.

In 2001, Duke University dedicated the Richard White Lecture Hall in his honor. Dick was given the title of the "University Distinguished Service Professor Emeritus of Botany" in 2005.

A fossil fern genus, *Dickwhitea,* was named for him in 2006 in relation to his 1995 suggestion that fern steles show underlying similarities to sympodial systems of eustelar seed plants.

Dick was also a volunteer in the community, active in Sister Cities International of Durham, The Senior Tar Heel Legislature and the Orange County Advisory Board on Aging. His leisure activities included listening to classical music, reading, and enjoying the pond and woods surrounding his home of more than 50 years in rural Orange County, NC.

Dick is survived by his loving wife of 59 years, Norma; his sister Marilyn Lechler; three wonderful children: Richard (Sandi) White, Karen (Wade) White-Tong, and Susan (Brian Smith) White; four outstanding grandchildren: Hannah White, Alexandra Tong, and Mason and Spencer Smith; and three incredible step-grandchildren: Taylor Penn, Tori Penn, and Wade Penn. He was predeceased by his parents and his brother Walter Charles White. He was loved by many in both his professional and personal life including his nephews, nieces, cousins, colleagues, and students. Dick will be remembered for his good humor and as a wonderful son, husband, brother, father, and grandfather. He will be missed by many.

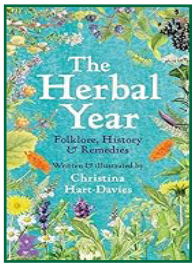
Gifts in his memory can be made to Trinity College, Duke University; Duke University Chapel; and the Sarah P. Duke Gardens, Duke University.

—By Melvin D. Turner, Norma White, and Susan White

BOOK REVIEWS

The Herbal Year: Folklore, History, and Remedies
Introduction to Plants in Central Somaliland
Isolated Wonder: A Scientist in the Robinson Crusoe Islands
The Light Eaters: How The Unseen World of Plant Intelligence Offers a New Understanding of Life on Earth.
A Little Queer Natural History
Nashville Native Orchids: Astonishing Science and Mysterious Folklore
Nature's Ghosts: The World We Lost and How to Bring It Back
Orchid Review 2024 Annual
Plant Collectors in Angola. Botany, Exploration, and History in South-Tropical Africa
Saving the World: How Forests Inspired Global Efforts to Stop Climate Change from 1770 to the Present.
Scent: A Natural History of Fragrance.
Trees and Forests of Tropical Asia: Exploring Tapovan
Wild Forest Home: Stories of Conservation in the Pacific Northwest

The Herbal Year: Folklore, History, and Remedies



Christina Hart-Davies
2024. ISBN: 978-0-300-26586-6
US$26 (Hardback); 256 pp.
Yale University Press

I feel like I did the American thing when I started reading this book in that I was surprised that, it being from Yale University Press, it was not focused on North America. But there is a lot of overlap with naturalized species and species that are similar to their European counterparts. The book is beautifully illustrated by the author with drawings on a lot of its pages. The chapters include an introduction, foods as medicine, spring, early summer, high summer, autumn, winter, colds and flu, further reading, acknowledgements and abbreviations, and an index. Each chapter includes a quote from various authors and historical figures to set the tone for that chapter. I definitely learned some things, including that Egyptians had the first writings of herb use.

Many of the descriptions include references and anecdotes—my favorite being the reference to "Johnny Appleseed" within the foods as medicine chapter. He was one of my favorite folk heroes growing up, being based on a real person; he really did bring apples out into the territories in the early days of the United States. Each species that is discussed includes historical uses for the plant and, in some cases, if those uses have been able to be confirmed through scientific testing. The author uses a mixture of onion and honey to soothe a cough and described how soldiers' wounds were treated with garlic in World War II.

The spring chapter discusses how there is research into the use of certain violets to treat cancer, which is inspiring and shows the importance of retaining biodiversity. Plantain leaves can be used on insect bites and stings, which I had not previously heard and will need to try. In early summer we find some commonly and well-known species such as mint to settle stomachs and poppies for pain relief. I was not familiar with yarrow as a

wound treatment, so that was an interesting anecdote.

Next we move into high summer, where we find my first word of caution in the use of common names. The author does a good job of including the scientific names for reference along with a common name, although Meadowsweet in the book (*Filipendula ulmaria*) is a very different species to the meadowsweet that we commonly see in the U.S. (*Spiraea alba*). So when using any guide, it's always good to check multiple references and make sure you have the right species. Further on in the chapter is a story about skullcaps (*Scutellaria* sp.) being used to treat rabies in the past, which requires further study. In Autumn we find another common name discrepancy with partridgeberry being (*Vaccinium vitis-idaea*), but I've always known partridgeberry as *Mitchella repens*. The North American partridgeberry has been used in teas for different ailments of its own.

Winter gives us wintergreen (*Gaultheria procumbens*), which has a common name counterpart the other way around with the *Pyrola* genus in Europe. An oil made from the leaves has been used to relieve pain. Witch hazel (*Hamamelis virginiana*) is still commercially available and can be found in some pharmacy aisles to treat external inflammation. I was surprised to not find Boneset (*Eupatorium perfoliatum*) until the colds & flu chapter since I've read about it being used to set bones during the American Revolution but not as a cold remedy, which was apparently a common practice of Native Americans. A species I would have expected to see was jewelweed *Impatiens* sp., which can be used on poison ivy (*Toxicodendron radicans*) to relieve the itching, and they can sometimes be found in proximity to one another.

There are a lot more species covered than the ones I chose to discuss and interesting historical references or anecdotes to be discovered. I think that some people would benefit by pairing this book with a field guide or more descriptive text in terms of identification because you want to be sure of an identification before you try to use something and that you followed the advice of seeking a professional's guidance. The book includes a disclaimer in the front that should be taken seriously, especially if you plan on taking anything internally.

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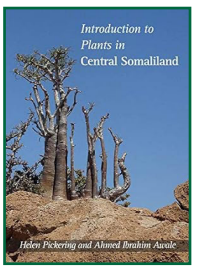
—David W. MacDougall, CWB®, PWS Consulting Biologist



Introduction to Plants in Central Somaliland. Hordhac ku saabsan dhirta ka baxa badhtamaha Soomaalilaand (ed 2)

Ahmed Ibrahim Awale, Faisal Jama Gelle, and Helen Pickering
2024. ISBN: 978-1-889878-76-8
US$29.00 (flex bind.); 148 pp.
Brit Press, Fort Worth Botanic Garden, Botanical Research Institute of Texas, Fort Worth, TX, USA

A small photographic guidebook for the non-specialist about some native and naturalized plants of Central Somaliland, including the coastal plain, Golis Mountains and the Hargeisa plateau, has been reissued to include a few more photographs and correct a few errors from the first edition. We meet the plants in central Somaliland with an eye-catching cover photograph of *Adenium*

somalense, familiar to this reader through its relative, *Adenium hongkel* observed during fieldwork in Sudan's Nuba Mountains, which "transforms the Nuba Mountains into a magician's rose garden at the time of its flowering" (Kirk, 1946). A translation of its Arabic name *shajarat al simm* is "poison tree"; it is used by the Nuba for arrow poison (Broun and Massey, 1929).

The first illustrated guide to Somaliland's plants begins with a short paragraph summarizing Somaliland's recent history, followed by an illustrated summary of the country's climate, landforms, and ecological zones, with basic maps. Thirteen pages of introductory material are followed by 120 pages illustrating 150 species, arranged alphabetically by plant family. Some accounts occupy a whole page; others only a half-page. All include at least one color photograph; a brief, non-technical description and a statement of the species' habitat and global distribution; plus names of each species: its Latin binomial, an English name, and a Somali name. Every page has bilingual text, in English and Somali. Both inside covers open with a wide landscape panorama. The back cover closes with an especially useful feature: an actual size ruler with units in centimeters and inches. There are three blank pages with lines for notes at the end of the book. The back matter includes a few references, a glossary of nearly 75 words, and two short indices: one for Somali names, the other for Latin binomials. Nomenclature follows Plants of the World Online (POWO), effective March 2023.

There is considerable variation in the amount of attention, via pages of photographs, allocated to each plant family; the largest numbers are: Acanthaceae (6 pp.), Apocynaceae (14 pp.), Asteraceae (8 pp.), and Leguminosae (14 pp.). Most photographs are high-resolution images. Ahmed Ibrahim Awale is an environmentalist, the chairman of the Somaliland Biodiversity Foundation, as well as Candlelight for Environment, Education and Health. He lectures on environmental science at the University of Hargeisa, and he is the author of several books including *Environment in Crisis: Selected Essays on the Somali Environment*. Faisal Jama Gelle works at the University of Hargeisa, where he manages the Biodiversity Museum for the Somaliland Biodiversity Foundation and teaches plant taxonomy. Helen Pickering is affiliated with the Herbarium, Library, and Art and Archives, Royal Botanic Gardens Kew and has contributed to photographic guides of wildflowers from Nicaragua, Oman, and the Victoria Falls.

It is disappointing that the Pedaliaceae are represented in this volume solely by *Pterodiscus kellerianus*, with pink flowers; it's also surprising that notes about its distribution indicate only Ethiopia. This is puzzling since the book's title is about Somalia; my ACCESS database of Pedaliaceae includes 21 herbarium vouchers of *P. kellerianus* from Somalia, and one from Kenya. Interestingly, the original description (Schinz, 1896) states that the flowers are yellow, whereas the flowers in the photograph (p. 113) are pink. Ihlenfeldt attempted to describe their diversity (2001, 2002, 2006a, 2006b) but concludes that the species *P. kellerianus* is very variable. The leaves are strictly pinnatified, but also lanceolate. Flower color is yellow as well as pink.

Based on herbarium vouchers, Somalia is rich in *Pterodiscus* species; others include *P. coeruleus*, *P. purpureus*, *P. ruspolii*, *P. saccatus*, *P. somaliensis*, and *P. undulatus*. It is unfortunate that the photographs of the flowers in this example were taken late in the day, when the flowers had wilted, depriving read-

ers of details from an open corolla, necessary to identify species.

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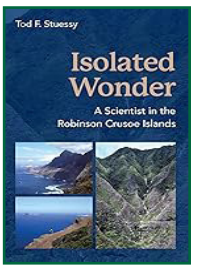
Isolated Wonder: A Scientist in the Robinson Crusoe Islands

Tod F. Stuessy
2024. ISBN- 978-1935641285
US$30.00 (Paperback); 312 pp.
Missouri Botanical Garden Press,
St. Louis, MO 63110



Las Islas de Juan Fernández (Robinson Crusoe Islands) lie approximately 600 km from Valparaiso, Chile. Currently a national park, the Islands became unveiled to the world at large when Daniel Defoe penned "Robinson Crusoe." The Juan Fernández Islands are indeed isolated wonders harboring two endemic families (Lactoridaceae and Thyrsopteridaceae), 12 genera, and 126 species. This kind of classic island laboratory was ideally suited for the creativity, cross-cultural competencies, and research talents of Tod Stuessy.

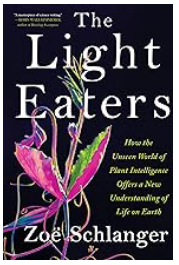
In "Isolated Wonder: A Scientist in the Robinson Crusoe Islands," Stuessy shares the steps required to establish a shared research program with his home institutions, The Ohio State University and the University of Vienna, and colleagues at University of Concepción. The collaboration among these institutions, and invited research participants (e.g., Greg Anderson, University of Connecticut), is chronicled in the book. Stuessy's collaborator at Ohio State, and later the University of Kansas, Daniel Crawford, was a key participant in shaping the Robinson Crusoe Island research program. It is no surprise the book is dedicated to him. From flavonoids to plastid phylogenomics, Crawford kept pace with the latest tools. Over a 40-year period (12 expeditions), this synergistic research team produced numerous scientific publications. What "Isolated Wonder" does is share the natural history of the island and its remarkable flora, in the context of stories focusing on human interactions, challenges, and failures, which come with doing fieldwork in a remote region. Sections of this text seem as if you are reading from Stuessy's personal diary. On the other hand, this frank style contributes to what I believe makes "Isolated Wonder" an excellent reading book for a lab group.

If you are a graduate student, postdoctoral researcher, or a fortunate individual landing a faculty line at a university, you should read this book. Stuessy is a gifted teacher and one of his favorite tools in the classroom is the case study. I must come clean here and share with the reader that he was my doctoral

advisor. I did not work on the Islands; my love has always been for continental high-elevation floras, extant or fossil. This entire text is a case study on how to build a research program, forge collaborations, and develop and build cross-cultural collaborative competencies. However, it is also a guide for discovering your own life equation for happiness by balancing all the elements in your life.

–Melanie L DeVore, Professor of Biology, Department of Biological and Environmental Sciences, Georgia College, Milledgeville, GA 31061

The Light Eaters: How the Unseen World of Plant Intelligence Offers a New Understanding of Life on Earth



Zoë Schlanger
2024. ISBN: 978-0-06-307385-2
US$29.99 (Hardback); 291 pp.
HarperCollins, New York, NY

Non-botanists as well as botanists of all ages can enjoy reading *The Light Eaters*, a new book by Zoë Schlanger, a staff writer at *The Atlantic* magazine, where she covers climate change. It is a persuasive tribute to plants for their ingenuity and resourcefulness, from the viewpoint of an observer, not a professional botanist.

A variety of consequential questions are included, e.g., in what way science changes its mind. Schlanger writes empathetically about the struggles of botanists whose theories were ridiculed but later upheld. David Rhoades is one example in the field of plant transference. Rhoades (1985) reported that plants send out distress signals via volatile chemicals released in response to damage of their leaves, which can cause chemical changes in neighboring, undamaged plants that render the undamaged plants less suitable as food for leaf-chewing insects. The dynamic interplay between herbivore offensive feeding strategies and plant defensive mechanisms plays a crucial role in understanding herbivore population fluctuations and broader ecological theory.

Plant communication is examined throughout the book. Wout van Hoven, a South African wildlife nutritionist, received an alarm, also in 1985, about dead kudu scattered across various game lodges. After the kudu population density had increased in response to the popularity of hosting safari hunting, the kudu diet of *Acacia* leaves caused those trees' leaves to become depleted. That led to a response by the species to increase leaf tannin content from 4% to 12%, thereby ensuring those leaves were unpalatable to kudu.

Schlanger seems fascinated with incidents related to phytochemistry, for example, the protection received by birches by the transfer of secondary compound from *Rhododendron tomentosum* as defense from weevils—followed by a related concern that pollution appears to sabotage plants' abilities to send and interpret these sophisticated signals. An example from industrial agriculture is the trend to grow vast tracts in monoculture of a single crop such as corn as grown commercially, diminishing its ability to summon beneficial predators.

Schlanger remarks on phenomena including sex switching by gingkoes as well as epigenetics, the impact that specific environments have to modify genes such that the genetic changes persist through generations. A stunning example is that beach evening primrose can increase the sweetness of its nectar within three minutes of exposure to an audio recording of honeybee flight. Higher sugar content would better entice pollinators and increase the chance of cross pollination.

Maternal care in plants is praised, e.g., narrowleaf plantain with seeds produced on tall, exposed spikes. When air temperatures are high, the plantain lightens the color of the spike and darkens it when air is cool, to reflect or absorb the sun's rays as needed to keep developing seeds at an ideal temperature. Species may deposit their seeds directly at the base of their own stem, so the seedling can grow in the shade of its parent. Plants can alter the thickness of the fruit wall and of the seed's protective coat, both maternal tissues, to adjust the timing of the seedling's emergence. If a parent plant finds itself in a drier environment, it may make seeds with a larger surface area, so more water can pass through the seed's porous surface, keeping the embryo within well hydrated.

A noteworthy example of a species in Pedaliaceae with such a large seed, endowed with a large surface area, occurs as an endemic in Namibia's driest zones, i.e., *Sesamum abbreviatum* Merxm. It has larger seeds than any other species in *Sesamopteris* Meissner (1840), although seeds of all species in that section have lightweight membranous wings or tufts of wing tissue that enable water absorption and long-distance distribution. The seed's greater surface area allows more water to pass to the embryo; that enables its survival in the Namib Desert, its exclusive home. *Sesamopteris* species may be contrasted with those in section *Aptera*, which occur in savannah grasslands, e.g., *Sesamum angustifolium* (Oliv.) Engl. or *S. angolense* Welw.; those unwinged seeds with thick, hard coats fall close to the plant with little threat to survival.

The Acknowledgements provide information about Schlanger's enterprising efforts to receive fellowship support through artist and writing residences that increased her knowledge about botany. Among them, The Mesa Refuge in Pont Reyes, CA; Bloedel Reserve on Bainbridge Island, WA; The Strange Foundation, West Shokan, NY; Marble House Project, Dorset, VT; Folly Tree Arboretum in Easthampton, NY; Oak Spring Garden Foundation, Virgina, VA; National Parks Arts Foundation for a month in Hawaii Volcanoes National Park; and the National Parks Arts Foundation for a month in Hawai'i Volcanoes National Park on the Big Island.

Affordably priced, this book should be enjoyed by a wide readership. It can help to fill the considerable need for pro-science writing to foster science literacy. Research sources are supported with 16 pages of Notes, and a short 10-page Index.

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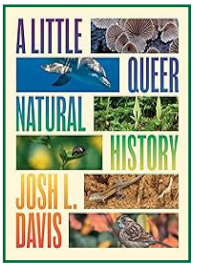
–Dorothea Bedigian, Research Associate, Missouri Botanical Garden, St. Louis, Missouri, USA

A Little Queer Natural History

Josh L. Davis
2024. ISBN-13: 978-0226837031
$15.99 (paperback); 125 pp.
University of Chicago Press, Chicago, IL



In *A Little Queer Natural History*, Josh L. Davis explores the diversity, ambiguity, and fluidity of sexual practices in a variety of species from the plant, animal, and fungal kingdoms. Davis, a science writer for the Natural History Museum, London, has published with the *Times*, *Observer*, *Guardian*, and others. He writes in the Introduction, "The personal selection of examples in this book

aims simply to give an overview of the sheer diversity of non-heteronormative biology and behaviours that exists in the natural world," which have been based heretofore on traditional "male" and "female" roles (p. 6). Indeed, the reader is left dazzled and amazed by the multidinous methods by which species create progeny, whether sexually or asexually. In his acknowledgements, found facing the Contents page, the author describes how the book originated in 2019 when Davis co-developed and led the Natural History Museum's "first-ever LGBTQ's natural history tours, ... [which] went on to become an award-nominated YouTube series."

Davis discusses how generalizing, human-centric language has biased and undermined observations of sexual practices in the field and elsewhere. Normative language can be misleading. He points out: "A good example of this is the wholesale application of the sex categories 'male' and 'female' onto plants. While this is common practice among botanists, it is also understood that in many cases the main body of the individual plant is often technically asexual in nature, due to something known as 'the alternation of generations' " (pp. 5–6). It is only the gametophyte, visible in mosses for example but not higher plants, that produces sex cells, not the sporophyte (the main plant and its flower). In other words, we may speak of "male" and "female" plants for example, but the "bodies" of plants are not gendered in the same way as animals.

Davis organizes his book around a series of case studies featuring 29 species, attractively presented with stunning photographic portraits in a squarish paperback (6.75 × 7.5 inches). Five plants are listed in the Contents, each with an explanatory tag in parentheses indicating the topic examplified: Saharan cypress (androgenesis), common ash (sexual spectrum), European yew (sex change), Chinese shell ginger (temporal sex), and Dungowan bush tomato (changeable sex). Every entry extends the discussion to related species and additional information, so the profiles become fascinating biology lessons.

Although there had been rumors of sightings of a cypress in the desert since the 1850s, the Saharan cypress (*Cupressus dupreziana*) was not described until 1924, when it was named after its definitive discoverer, Captain Maurice Duprez. Native to the mountains of southeastern Algeria, one notable specimen is thought to be about 2200 years old and is 39 feet (12 m) around and 72 feet (22 m) tall. The Saharan cypress practices paternal apomixis, also known as androgenesis, in which only male genes are passed along to the next generation. The egg cell is discarded and both male sex cells in the pollen grain combine to form the embryo. Androgenesis is extremely rare, being found only in this cypress, the fire ant, a stick insect, and a freshwater fish (p. 40). Crossing experiments with other cypresses have proven that it is not possible to create a hybrid, an indication of androgenesis. Only 233 wild cypresses are known, but specimens are being propagated in botanic gardens.

According to standard textbook definitions of floral expression, there are three categories: flowers may carry only male reproductive organs, only female reproductive organs, and both male and female reproductive organs ("perfect" or "cosexual" flowers). A tree, for example, that has separate male and female flowers on the same individual is termed *monoecious* (from the Greek, one house), while a tree that has its male and female flowers on different individuals is termed *dioecious* (from the Greek, two houses). The common ash (*Fraxinus excelsior*) mixes it up quite a bit, displaying a "sexual spectrum" that comprises

seven different expressions of *trioecy* found on different trees: only male flowers; mainly male flowers but some cosexual; mostly cosexual and some male flowers; only cosexual; mainly cosexual and some female flowers; mainly female flowers and a few cosexual; and only female flowers. Researchers interpret this in varying ways—as unstable and indicative of a transitional situation or as stable in ways not discernible at present.

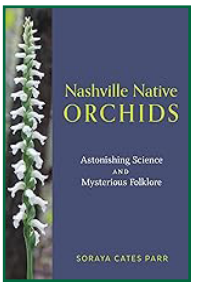
By now the case of the dioecious Fortingall yew may be well known to some readers. In 2015 the *Guardian* ran the headline "How Britain's oldest tree became 'sexually ambiguous' " after Kew botanists reported that a tree long considered male had sprouted a female branch and produced three seeds. It is thought to have been growing for over 5000 years. In 1796 the trunk was 52 feet (16 m) in circumference. Eventually the main trunk split but the yew still carries on enclosed by a stone wall and recently a cage. Sexual fluidity is pretty well known in dioecious plants, such as the striped maple (*Acer pensylvanicum*), but circumstances thought to effect the change vary—environmental stress may cause male trees to become female, but the reverse is also true. Publicity has not been good for the Fortingall yew because visitors have beseiged it, climbing over the protective enclosure and tying beads and other ornaments to its branches (Jason Daley, www.smithsonianmagazine.com, 20 June 2019).

Although the title might suggest the author is mounting a defense of queer behavior, the text reads more as a celebration of the diversity of reproductive methods and behavior in the natural world. Davis presents his evidence in even-handed, engaging prose, explaining complex information with commendable clarity, and invites readers to enjoy the inventiveness of other species. For example, one of the most photogenic of the species presented, the splitgill mushroom, has 23,328 "sexes," and male black swans make great parents, indicating that queer behavior does not limit evolutionary success. *A Little Queer Natural History* is not "little"; rather it is an impressive tour of "what's out there right now" (p. 7) that will enlighten readers considerably.

–Elizabeth Lawson (winpenny.lawson@gmail.com, www.elizabethwinpennylawson.com)

Nashville Native Orchids: Astonishing Science and Mysterious Folklore

Soraya Gates Parr
2024. ISBN: 9780826506580
US$26.95 (paperback); 155 pp.
Vanderbilt University Press, Nashville, Tennessee, USA



There are about 200 native orchids in North America, with approximately 50 of them in Tennessee. This book covers six species, which are found around Nashville. Native American orchids do not generally attract as much attention as their tropical relatives. Therefore, a book like this one, limited as it is in scope, is a welcome addition to the literature. As far as I am concerned, *Nashville Native Orchids* or *Nashville Native Orchids: Science and Folklore* would have been sufficient as a title. "Astonishing" and "Mysterious" are unnecessary adornments.

The first four sections deal with orchids in general and set the stage for the more detailed parts that follow. These sections are telegraphic, but interesting, informative, and necessary—especially for those who are just starting to learn about orchids. Those who are familiar with orchids can skip or skim them. In Chapter 1 (p. 5), photosynthesis should not be described as divine design. Carbon

fixation is a remarkable chemical process, which played a major role in the origin of life on earth and is of major importance at present, but there is nothing divine about it. A book (scientific or popular) about plants, even orchids, is not the place for preaching or the propagation of religion unless it is clearly labeled as a religious tract.

The parts about orchids in early America, very short as they are, are of more interest because not enough has been written about them. However, I wonder if the first paragraph on p. 17 is needed since it deals with roses and is confusing because it describes a shawl "filled with roses" that "were out of season." Yes, orchids may be a symbol of beauty at present, but fig. 3.1 on p. 18 barely shows that. It measures 6.5 × 11 cm and has a bleached 1.5 × 10 cm image of a *Tipularia discolor* image in the center. The rest is fuzzy background, which includes what looks like some sort of skull. A good editor working for a first-class publisher would have either removed the first paragraph on p. 17 and fig 3.1 (did this book have any kind of an editor?) or edited the writing and improved the picture.

Spiders hide in orchid plants or weave their webs strategically near or around them or their flowers while stalking their prey (Yam et al., 2002). This has been observed worldwide, but has not been studied extensively, especially in North America. Therefore, Chapter 5, copiously illustrated as it is, is of considerable interest and most welcome. I only wish it presented more details and examples than it does and was longer than the six pages devoted to it. However, here too I have complaints about the book editor and publisher. Figure captions must stand on their own. Therefore, in fig. 5.2, *Verrucosa arenata* should have been described as a spider. Also, was it "finding sanctuary" or was it hiding in the hope of snagging prey? And fig. 5.3 should have been post-produced to make it clearer and sharper. My hope is that the author will follow this book with a detailed and extensive study on orchids and predatory spiders. Such a study will be an important contribution to the literature on orchid biology. The author, who is clearly capable of observing, photographing, and writing should select a better publisher and demand a good editor, or write a paper on predatory spiders, which hide in orchids, for a peer-reviewed journal.

A key to the six species follows. It is described as simple, and it is, but it seems to be very workable. It should be of use to those who may wish to find the species it covers. I have not tried to use it due to lack of access to the species it deals with. Pages 37–120 deal with *Galearis spectabilis, Goodyera pubescens, Liparis liliiflora,* the *Spiranthes cernua* complex, *Tipularia discolor,* and *Cypripedium parviflorum* var. *pubescens.* On the contents page and in the text, each of these orchids is given an additional description or name, which adds mostly verbiage, but in one case lists a common name. Two examples of the former are "A Showy Spectacle Living in Secrecy" for the *Galearis* and "It's Going to be a *Goodyera.*" I assume that the latter is intended to be a play on words for "good year." For *Cypripedium parviflorum* var. *pubescens,* the addition is a common name: "The Shoe of Venus." It is based on the generic name, derived from the Greek Κύπρις (Kúpris), referring to Aphrodite, and πέδιλον (pédilon), meaning "sandal." Every species is described in some detail, which includes good and informative, or at least sufficient, descriptions of stems, roots, rhizomes, leaves, flowers, fruits, seeds, pollination mechanism, and seed dispersal. There are many illustrations; some are good. Others could have been but are not due to poor post-production and printing.

An interesting feature of the book is ethnobotanical information about some of the species. For example, *G. pubescens* was used for kidney problems and pneumonia, *L. liliifolia* was said to cure chest congestions, and *C. parviflorum* var. presumably calmed children. The reference on page 47 to a study by the author that showed that seeds of *G. spectabilis* are attached to bird feather and dispersed that way is most welcome. So is a reference on the same page regarding research in Japan, which showed that orchid seed dispersal can occur in the digestive tracts of birds. What I found most interesting is another study by the author (p. 104), which showed that *Tipularia* seeds become attached to the fur of young racoons and are thus dispersed.

Still, there are problems, which are the responsibility of the author:

- In several places (for example pp. 16, 43, and 103), fruits are described as pods. They are capsules.
- On page 54, Robert Brown is described as a paleobotanist. He was a taxonomist (one of the first to describe Australian orchids), delved into orchid pollination and ovules (and in the process discovered cell nuclei), and noted what is now known as Brownian movement—but he was certainly not primarily a paleobotanist.
- Pollinia are referred to as "was" on pages 59 and 60 despite being the plural of pollinium.
- Seeds are described as circulated on page 60. They are dispersed.
- "The long process" of seed "development" on page 61: Is it seed formation or germination?
- "Symbiotic" (or "mutualistic" because the spiders sometimes eliminate grazers) is the proper description of the spider relationship to the orchid on page 62, not "advantageous."
- "Built . . . to take advantage" on page 63 is teleological and/or anthropomorphic.
- Orchid seeds do not mostly or usually "fall in proximity to the parent plants" as stated on page 75 or "fall to the ground in the area of the colony" (p. 103). Some seeds may do that, but they are usually dispersed to some distance (Arditti and Abdul Ghani, 2000; Arditti, 2024).

Notes (actually references) for each chapter are presented separately. The result is that some are presented several times, even for one and the same chapter. There is no single or consistent format. For example, Sarah Rose's *Spiders of North America* is listed once as such and three times as "Rose, Spiders of North America" in the notes for Chapter 5 (p. 143), and then again in the bibliography (p. 153). Some notes (references) are cryptic, such as "Wiggington, Foxfire Book, 230." In the text, references are given as a superscript, as for example, "germination of orchids.[10]" Standard citation format (in this case "Nuttall, 1923") should have been used. Superscript citation is highly unusual for a book about plants and/or in the sciences. It would have been much better to follow a commonly used format in plant sciences and list all references in a single Literature Cited. This bibliography/citation/notes/references mess could and should have been avoided with good editing by a competent copy editor.

Another problem with this book, which is also only the publisher's responsibility, is its small size. Pages are only 13 × 19 cm with text and illustrations measuring mostly 9.4 × 14.7 cm. This small page size forces tiny illustrations, such as 3.8 × 4.2 on page 100. A proper size would have been 20.5 × 27.6 cm (8.5 × 11 in) with 17.9 × 24.6 cm of content. To see what can be accomplished with such a size for an orchid publication, Vanderbilt University Press should have referred to *Orchids*, the magazine of the American Orchid Society.

A number of the illustrations are not sufficiently cropped. For example, Fig. 8.10 on page 75 measures 3 × 4.9 cm, but contains seeds that occupy only 2.2 × 2.8 cm. With proper cropping even this small figure could show more details of the seeds and less empty space, which serves no useful purpose. Another example is Fig. 10.12 on page 103. It measures 5 × 3.6 cm, but the seeds take only 3 × 3 cm and an unnecessary black pencil or stylus measures 0.2 × 2.3 cm. The rest is empty space. In addition, the seed image is very dark. Details of the seed coat and embryo are hard to see. On top of these problems, the printing of several illustrations is poor. For example, Fig. 1.1 on page 7 is not much more than a black blob surrounded by empty space, and Fig. 8.8 on page 73 lacks enough contrast to show much of the two foraging flies.

This is an interesting book about six American orchids, which is not bad. I certainly learned from it. The author certainly put her heart and mind into it and produced a book with some, but tolerable, shortcomings. However, it could have been much better and more impressive with improved editing and design. Unfortunately, the publisher seems to have put in a minimal effort and did an inadequate job of designing, editing, copy editing, and figure preparation and printing. Because of these publishing inadequacies, this could have been a better book than it is.

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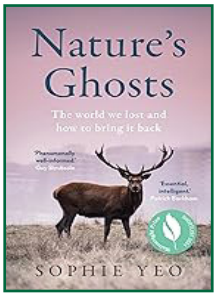
Yam, T. W., J. Arditti and N. Anghelescu. 2022. Predators in orchids. *Orchids* 91: 820-933.

—Joseph Arditti, Department of Developmental and Cell Biology, University of California, Irvine

Nature's Ghosts: The World We Lost and How to Bring It Back

Sophie Yeo
2024. ISBN: 978-0-00-847412-6 (hard cover)
US$29.99; 327 pp.
HarperNorth, Manchester, UK



At first glance one might assume that "Nature's Ghosts" of the title might refer to species that have gone extinct, but this is only part of the author's intent. It also refers to the history of the environment where those species lived. Yeo makes the argument that the landscapes of the past were richer than they are today and that this should inform any attempts at "rewilding." She is not saying that the goal should be to return to the conditions of any particular previous time, but rather that past ecosystems should be considered in directing conservation efforts even as climate change is ongoing.

She begins by addressing "When humans were wild." As a young species, humans had no more impact than any other animal on their ecosystem, but by 500,000 BP stone tools were being used and fire became a tool

by 400,000 BP. These tools allowed humans to begin "sculpting" their environment. Today the impacts of indigenous peoples are well understood, but conservationists often still think of "natural" as the conditions of only a few centuries ago. We now know that by the origin of agriculture (ca. 10,000 BP) humans were already driving the Pleistocene megafauna to extinction and probably less than 4% of all temperate woodlands were undisturbed.

In the second chapter, "Small and Beautiful Clues," she dismantles the common British misconception of "Wildwood." Based on lore and Roman conquest records, the ancestral condition of Britain (and all of Northern Europe) was presumed to be ancient forest well into the Middle Ages. But palynological evidence suggests that within a few millennia of glaciation, large expanses of forest were suddenly cleared and burned. To prove their point, in 1952 a team of two archeologists using stone tools (one an original artifact) out-cleared an area of forest over a team of professional woodsmen using modern axes. Later, three people cleared 500 m^2 of forest in one day using handmade stone tools (the trick is in the technique: know your tools and how to use them!).

In other chapters Yeo presents animal examples such as extirpation of sharks in the Solomon Islands, White-Tailed Eagles in Wales, and Golden Beaver in California. These examples are useful to illustrate several themes. First, non-traditional records, such as poetry, weapons and other human artefacts, place names, and stories can be useful in identifying the former presence of now extinct species. Second, in many cases extinction occurred so long ago that even memory of those species' occurrence in an area have been lost. Third, these illustrate a "shifting baseline theory" in that we tend to compare current occurrence with our lifetime memory. For instance, recovery of an "endangered species" is applauded even though the current population may be only a very small fraction of the species' prior extent.

Several chapters bear on restoration philosophies and attempts. The usual default is to maintain or restore to the present natural state. This is the policy of the 1964 Wilderness Act in the U.S. and the current UK conservation policy. For some it has been termed "fortress conservation," or simply stasis. However, the general pattern for landscapes over the past 66 million years has been change, and this will be exacerbated by current human-induced climate change. A second philosophy is to assume a future natural state and "let nature go." Here the problem is to control for likely human-assisted invasions and overdominance by current "hardy" species. A third approach is to restore to the "original natural state" by eliminating non-natives and reintroducing historic species. A current example is the Scottish Carrifran Wildwood, a private preserve Southwest of Edinburgh. While this experiment is quite successful and diversity is rebounding, another experiment in the Highlands, at Glen Affric Pinewoods, was not. From east to west, the land bordering this loch transitions from a Scots Pine forest to bog and heath. The pinelands were presumed to be native and ancestral with the wetlands the result of human deforestation. The restoration effort drained the bogs and attempted replanting of a gymnosperm forest (of Sitka Spruce rather than Scots Pine!). The plantations failed and it was later discovered that the bogs were, in fact, ancestral and spreading to replace the pines as the Paleocene climate got wetter. Knowing the true history of a landscape is important.

Given the documentation of human impacts over time and around the world, it remains encouraging that although ecosystems are easy to destroy, it is difficult to obliterate their sign. Remnants of each leave an impact on what succeeds and thus clues to potentially successful restoration. Particularly important are clues to the potential range of suitable habitats for individual species, which tends to be greater than we might expect (Laughlin and McGill, 2024).

The author is a British journalist, which explains her focus on the UK and Europe, but the ecology and geologic history described are universal and examples are included from around the world. The text is easy to read, even when the concepts are deep. Each chapter is well documented with extensive endnotes. This would be a great book to use both as a common reading in a freshman seminar or as the focus of an upper division or graduate seminar in ecology, conservation, or environmental science.

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—Marshall D. Sundberg. Kansas University Affiliate and Roe R. Cross Distinguished Professor of Biology – Emeritus, Emporia State University.

Orchid Review 2024 Annual, Volume 132, Number 1342

James Armitage (Editor)
2024. ISBN 9781911666387
US$23.00; 128 pp.
Royal Horticultural Society, Peterborough, UK

During its first 76 years, the *Orchid Review* (OR) had four editors:

- Founder Robert Allen Rolfe (1855-1921), volumes 1 (1893)-28
- Alfred Gurney Wilson (1878-1957), volumes 29-40
- Charles H. Curtis (1870-1958), volumes 41-66
- John Blowers (ca, 1920-; full disclosure: he was a friend) volumes 66-77, 98-99.

This stability made it the world-leading orchid journal. After 1970 it had nine editors, lasting 3 months to 10 years. The frequent changes and uneven editorial talents were debilitating and may be responsible for the current problems. Rolfe's death and world wars reduced publication frequency and caused publication hiatus, but *Orchid Review (OR)* returned as a 12 issues/year leading orchid magazine. Starting in the 1970s, production costs and fluctuating subscriber numbers generated deficits. Individuals and the Royal Horticultural Society (RHS) covered them. Publication frequency was reduced to six, then four, issues/year. RHS eventually took over. Deficits continued. In 2023 the *OR* became annual. This issue is the second annual.

In becoming annual, OR may be trying to emulate the *Malayan Orchid Review (MOR)*, initiated in 1931 by the Malayan Orchid Society, Singapore and now annually by the

Orchid Society of South East Asia (OSSEA). *MOR* is excellently designed, illustrated, and edited, with a variety of interesting articles. Authors usually contribute one article per issue. In comparison, like its annual and quarterly issues predecessors, the current *OR* can be boring, uninteresting, and repetitive in spots. Illustrations and design could be better.

An article on growing orchids in terrariums (pp. 6-13) is interesting and provides useful information. Given increased use of LEDs, information on them is welcome. Photographs in this article could have been reproduced and designed better. On pages 14-17, members of the RHS Orchid Committee advise readers on growing orchids at home. What does "home" mean: living room, bedroom, bathroom, etc.? *Orchids* (American Orchid Society) publishes articles about home orchid growing but is very specific about locations. On page 16, an image of a bright blob can be anything. Seed germination is not as easy and simple as suggested. It is possible but requires a well-equipped niche.

Stories of three collections occupy pages 18–31. Two of the stories are uplifting because the collection is being saved. The third is a plea to save a collection. It seems like article(s) about this same or a similar collection in previous issues. If the other two collections can be saved without repeated pleas, why not this one? Is this article really necessary? (Full disclosure: I clashed with the author over his participation in an attempt to boycott the 17th World Orchid Conference in Kuala Lumpur.) The editor should have been stricter deciding if this article deserved publication. Further, three photographs (pp. 29, 70, 71) of one person in a single issue is excessive.

Trade between orchid-rich countries in the Americas enriched UK collections while damaging forests of source countries. An article about 19th-century Colombian trade (pp. 32-37) is enlightening. I am disappointed that it did not dwell on, but only alluded to, the destruction this trade caused. If the author failed to mention the rapacious trade, the editor should have insisted on it. *OR* of yore served those who accumulated collected orchids. The environmental pillaging by major orchid firms' collectors of the time must not be forgotten.

When orchid growing in the UK was popular, excellent artists produced color illustrations for magazines like the *Botanical Magazine, Botanical Register,* and *Orchid Album*. One of them was Sydenham Edwards. The article about him is interesting. It mentions "sale of coloured plates taken from the original publications," but fails to criticize dealers who tear apart old treasures, frame their illustrations, and sell them for substantial profit. The editor should have demanded criticism. A lesser-well-known artist was Ethel Harting (1870-1942). Calling attention and analyzing her paintings in a well-written article (pp. 40-43) deserves a place in the 2024 *OR*.

A most "interesting" book (pp. 44-45) is *Orchids Cultivated at Gatton Park Surrey* by Sir Jeremiah Coleman (1859-1942, mustard fame), a well-known grower in his time: "Apart from the title page and two colour plates it was entirely blank." The discussion of this rarity is fun to read.

I wonder if several articles on a single subject (four on history, seven on shows, three on collections) should have been published in one issue. Fewer articles per topic on more topics would have been better. There are seven (!) descriptions of orchid shows over 25 pages (pp. 46-71): one fifth of the total 128 pages.

Almost two pages are devoted to photographs of one author. Some space devoted to photographs in this section is wasted. Images are too small and show only spots and lines (pp. 49, 53, 58, 62, 66, 69). Are so many show descriptions necessary? Were they included to please the authors (three sets, authored two descriptions each, a single author wrote one) or were they published to fill space? Is it necessary to state that young orchid plants grow into clumps (p. 63) or that one author will increase a collection of butterworts (p. 65)? Show descriptions should have been limited in number and pages.

Like other orchid magazines, this *OR* publishes a new hybrids list (pp. 72-81). The list pays attention to nothogenera (hybrid genera), possible because intergeneric crosses are feasible in orchids. *Laeliocattleya (Laelia* × *Cattleya*) hybrids, have been known for years. A cautionary note/explanation is necessary but is lacking because some single genus crosses (*Vand*a × *Vanda* hybrids, for instance) became *Papiliovanda* nothohybrids when several Vanda species became Papilionanhe. This becomes more complex with nothohybrids involving several genera.

Of two articles on wild orchids, the first about Indonesian New Guinea (pp. 82-91) is very interesting and a pleasure to read. The second (pp. 92-99) about the Mediterranean is much less interesting. It reads like a commercial for travel in that region. The two-word titles in parts of it are silly.

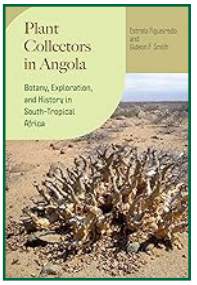
"Notes on Names" (pp. 100-105) repeats thrice the same story about five species and one hybrid, *Dendrobium sukhakulii* from Thailand, *Catasetum lendarium* from Brazil, and three platantheras from California: synonyms, structural uncertainties, origins questions, identity arguments, and opinions. The *Platanthera* article lists two authors but is mostly written with the "I" pronoun by only one. References for all three are arranged confusingly. One or two articles about nomenclature do belong in a general orchid magazine, especially if they are interesting, but four is too many. An important note (p. 105) about new rules regarding the naming of nothogenera is not listed in the Contents (p. 3).

There are 29 articles (one in seven parts for a total of 36) by 21 authors, including the editor. Five authors wrote two articles each, one author contributed three, two penned four jointly, and one produced five. Thus, nine authors contributed 22 of the 29 (or 36) articles (75% or 61% of the total). In comparison, the *MOR* annual issue for 2023 (2024 yet to arrive) contains 29 articles and one editorial written by 34 authors. One author wrote two show descriptions. Not surprising, the 2024 *OR* is boring, repetitious, and less interesting than the 2023 *MOR*. Additionally, bylines are annoying. Instead of listing names only, as is common, bylines consist of sentences purporting to describe author(s) activities and/or reasons for writing. One awful example is ". . . joins the revels in London and takes a modest bow of his own." A list of awards (pp. 106-125) and an index (pp. 126-128) complete the issue.

As mentioned, the conversion to an annual was made in a commendable effort to save *OR*. It is not enough. *OR* must improve greatly to survive. This review, harsh and demanding, is a lament. I grew up in orchids with the *OR*. My set starts with Volume 1, No 1. It will be sad to see it disappear. I hope that *OR* will, as it has done before, return to a 12 issues/year major orchid periodical.

—Joseph Arditti, Department of Developmental and Cell Biology, University of California, Irvine

Plant Collectors in Angola. Botany, Exploration, and History in South-Tropical Africa



Estrela Figueiredo and Gideon F. Smith
2024. ISBN: 9780226832067 (cloth), 0226832066 (hardcover), 9780226832081 (paperback), 0226832082 (paperback, electronic book)
US$135.00 (Cloth, Paperback); ebook, $45; 354 pp.
Regnum Vegetabile 161. University of Chicago Press, Chicago

Estrela Figueiredo and Gideon F. Smith, two plant taxonomists uniquely knowledgeable about taxonomy in Angola, present a welcome comprehensive biographical history of its plant exploration. Their new book appears to be an expansion of the article by Figueiredo et al. (2020) about the botanical exploration of Angola by Germans during the 19th and 20th centuries. The volume provides brief accounts of about 358 of Angola's plant collectors that can be viewed as encyclopedia entries, presenting succinct highlights about the botanists' challenges and accomplishments. Most records comprise just one to two pages; the essays are not exhaustive, but offer instead salient notes about each botanist's achievements, while advancing insight into one of Africa's least-investigated region's landscapes.

What appeals to me especially are the color maps, illustrating the routes they traveled, and portraits (some also in color) of the collectors. These sketches bring a typed name on a dry herbarium specimen label, such as those that I have pored over, to life. Major collectors whose names appear often in my ACCESS database of 368 unique collections of Pedaliaceae from Angola, are Óscar Azancot de Menezes (39 entries), John Gossweiler (35), Eduardo Mendes (27), Friedrich Welwitsch (26), and R. Mendes dos Santos (17). Notably, Austrian botanist Welwitsch's collections were the basis for describing approximately 1000 new species, among them the distinctive *Welwitschia mirabilis* endemic to the Namib Desert of Angola and Namibia; Swiss botanist Gossweiler's endeavors were the basis for *Carta fitogeográfica*, Angola's first vegetation map (1939, with Mendonça).

The significance of this essential reference work can be appreciated because today, Angola embodies the largest major gap in our knowledge of plant diversity in southern Africa. Civil war and remoteness deterred exploration. The protracted civil war that followed independence in 1975 ended in 2002, but evidence of the conflict is still perceptible due to land mines that remain to be cleared. For a start, editors Huntley et al. (2019) assembled an overarching review, *Biodiversity of Angola,* that provides an authoritative report of the aftermath, when biological exploration of Angola went ahead.

Renowned plant collectors known for their surveys of other regions of Africa also appear in these pages. A stunning color photograph of French naturalist, humanist, scholar, and—according to these pages—"collector extraordinaire" Théodore Monod, taken at Oued Akerdil, Adrar de Mauritanie, accentuates his pioneering of the environmentalist movement in France. It is not known how many collections he made in Angola, but examples are available in 11 world herbaria.

Equally as valuable as the text of this compilation is the extensive bibliography in Literature Cited, consisting of 34 pages! The end note listing contributors of information or photographs for the volume in vast, indicative of the depth of research needed to assemble this volume.

The book is dedicated to two botanists: Jose Alberto de Oliveira Anchieta (1832-1897), whose tribute refers to him as "[a] maverick Portuguese naturalist who settled in Angola and represents all of those who sacrificed comfort and riches for the love of science," and Maria Fernanda Duarte Pinto Basto da Costa Ferreira (1938-), an "Angolan technician who represents those working behind the scenes, without whom many collections made in Angola would remain unprocessed and undetermined." It was my privilege to spend several months in the company of Maria Fernanda during visits to LISC herbarium, in 2005 and 2015, and I remember her smiles, warmth, and kindness as she watched my enthusiasm over each little unearthing as I worked my way through their substantial Pedaliaceae collection, gratified that her efforts were being put to use.

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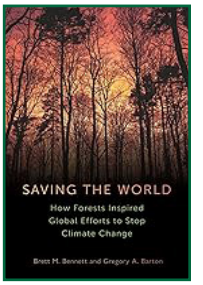
–Dorothea Bedigian, Research Associate, Missouri Botanical Garden, St. Louis, Missouri, USA

Saving the World: How Forests Inspired Global Efforts to Stop Climate Change from 1770 to the Present



Brett M. Bennett and Gregory A. Barton
2024. ISBN: 978-1-78914-874-9
£18 (hardcover); 272 pp.
Reaktion Books Ltd, London, UK.

The island of Mauritius, known for the 1690s extinction of its most famous endemic bird, the Dodo, is also notable for a claim made by its French colonial intendant, Pierre Poirre, 80 years later. Poirre claimed that destruction of native forests was responsible for a dramatic decline in rainfall on the island. This is the first statement directly linking deforestation with climate change—what the authors term "climatic botany." Furthermore, his tree-planting policy was the first government attempt to mitigate human-caused climate change. The book's seven chapters document the cyclical ebb and flow of acceptance of climatic botany over the past 350 years.

Beginning during the period of the European Enlightenment, secular and materialistic governments were dividing up the world and scientific practice was evolving. Buffon, the French scientist, recognized that climate had changed radically over time and that this was a force in animal distribution. He believed that human modification of European forests resulted in the moderate climate of Europe relative to similar latitudes in North America. So, for instance, his acquaintance Thomas Jefferson encouraged Americans to improve the climate and minimize extreme weather events through deforestation and improving the land through agriculture. At about the same time, Alexander von Humboldt, the first popularizer of climatic botany, made the counterclaim that deforestation had negative

effects for all climates because it decreases precipitation with a "cascade of negative ecological, climatic and economic reactions" (p. 51). Between the 1820s and 1850s, human-induced climate change was linked to the lack of limits on population growth.

Joseph Dalton Hooker, influenced by Humboldt, wrote to Darwin that climate change in India due to deforestation reduced rainfall and monsoons. As advisor to the East India Company, Hooker encouraged Governor General Dalhousie to plant trees in the Punjab and create forest reserves in India. Dalhousie hired the German Botanist Dietrich Brandis to create and oversee the Indian Forestry Service, which by the end of the 19th century was recognized as a model by the rest of the world.

In the U.S., Theodore Roosevelt created the Forest Service and set aside lands following the Indian model, but changes in science led to changing attitudes toward climatic botany. The rise of meteorology and climatology, which recognized atmospheric and oceanic dynamics, pushed climatic botany to the side. Tracking hot and cold fronts and jet streams downplayed the role of local sources in producing rainfall. Backlash from western states and the Corps of Engineers further diminished the old-fashioned ideas of plants impacting nature. Humans could now control nature!

"Desertification," a term coined in the 1920s, became a new focus of concern and debate. The authors explain that the simultaneous recognition of desertification occurring around the world and the astronomical discovery of "canals" on Mars led to public perception that "earth faces the same future as Mars because of our 'wicked' ways." They note that this idea "remains popular even in the twenty-first century" (p. 118). Horton's Hydrological Cycle provided obvious clues about how to deal with the desert—limit runoff and build dams and reservoirs to promote evaporation. Then, with the recognition that nuclearization is necessary to produce rainfall, just "seed" the clouds. Unfortunately, none of these measures prevented the Dust Bowl.

In the mid-1960s ecologists began experimental work in defined catchment basins to scientifically settle the long-standing supply side (plant trees to increase precipitation) vs. demand side (conserve existing water by limiting trees) debate. Studies in the eastern U.S. demonstrated that local evaporation contributes less than 14% of the moisture for rainfall and 85% comes from oceanic evaporation; little local impact became the orthodoxy with forest influence <5%.

In less than a decade, however, the tide turned as studies shifted to the Amazon. While 52% of the moisture still comes from the Atlantic, 48% is recycled within the Amazon basin through evapotranspiration. This change from regional to global influence of forests on rainfall, simultaneously with the movement toward global environmentalism, has refocused climatic botany—precipitation increases downwind from forests. Increase rainfall by replanting and reforesting in the right areas.

The authors are environmental historians at Western Sydney University and provide a worldwide view of the history of climate change in a very readable and well-documented treatment. There are extensive endnotes and a brief index. This would be a good book for a focused upper-division or graduate seminar in environmental history or environmental science. There are no figures,

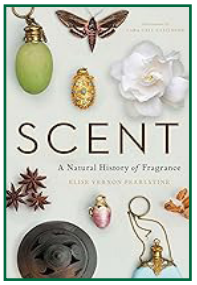
tables, or illustrations, which may limit its attractiveness for undergraduates and the general public.

Finally, a Google search of "climatic botany" provides an AI definition limited to how climate affects plants and their growth. The authors' working definition coining this term is precisely the opposite—how plants affect the environment and in particular how trees increase precipitation. As they note, this is the relationship theorized by many tropical explorers, beginning with Christopher Columbus (pp. 17-18).

—Marshall D. Sundberg. Kansas University Affiliate and Roe R. Cross Distinguished Professor of Biology – Emeritus, Emporia State University.

Scent: A Natural History of Fragrance

Elise Vernon Pearlstine, author; Lara Gastinger, illustrator
2022. ISBN: 978-0-300-24696-4
US$28.00 (Hardcover); 256 pp.
Yale University Press, New Haven, London



The use of plants for their scent has been known since antiquity. Pearlstine introduces readers to the rich history of their precious perfumes with a thematic arrangement. Each entry describes the plant with its Latin binomial and expounds with enthusiastic stories about where they're grown and processed.

The organization of the book reflects the botanical plant part used. Opening the book are chapters about incense, wood, and resin. First, Pearlstine distinguishes torchwoods (i.e., frankincense, myrrh, copal), from fragrant woods, agarwood, and sandalwood. Although I realize that the plants are resinous, it puzzled me that hemp is included among torchwoods. Spices receive considerable coverage in chapters about the spices of the western Ghats, the Spice Islands, and ample attention to saffron, vanilla, and chocolate.

Scented gardens and aromatic herbs fill the next sections. Generous attention is paid to the significant role of pollinators in the reproduction of fragrant flowers. I learned that rosemary plants can alter the size of their flowers, forming larger flowers at higher altitudes so that those flowers can be more accommodating to the larger-bodied pollinators of the mountains, e.g., larger bumblebees. Unsurprisingly, roses receive a full chapter, although mysteriously, orchids appear at the end of that chapter. Buzzing bumblebees create vibrations that function to trigger rose anthers to release pollen. Theophrastus wrote that sesame oil was the vehicle used for the extraction of rose essence.

Perfumery from mandarin to musk receives considerable attention—from its "humble beginnings," namely mint and turpentine—to elaboration about the chemical constituents of perfume notes of each flower used in the perfume industry, both natural and synthetic. The unique flavor of the Greek-resinated wine retsina is from *Pinus halepensis*.

The opulent combinations of fragrance and fashion feature in the closing chapters. A chapter titled "Impossible Flowers" describes the difficulty of recreating certain scents, especially lilac. Readers can follow the tribulations and creative endeavors involved in building a perfume composed of volatile aromatics. Pearlstine relishes in documenting the trials and triumphs of experimentation necessary in the scented worlds of the fashion industry.

As an added enrichment for readers, the first page of 12 chapters is interleaved with black-

and-white hand-drawn images.

The dust jacket tells readers that after a 17-year career in wildlife biology, Pearlstine found a second life as a natural perfumer, consultant, and educator. She conducts classes for corporate and private events, instructing students about the biology, artistry, and history of perfume ingredients. *Scent: A Natural History of Fragrance* appears to be a compilation of lecture notes assembled by the author for her series of presentations. Readers should not expect to find a systematic reference book, but rather a highly personal, conversational style, a combination of storytelling with historical accuracy and beguiling botanical details related to scented plants, along with personal memories of the author.

The contents emphasize the subtle connection between scent and emotional well-being. Fragrance has the power to influence our moods: alertness, assertiveness, concentration, confidence, contentment, creativity, focus, happiness, joy, memory enhancement, peace, performance, positivity, restfulness, self-esteem, self-image. Perennially popular, the appeal of scent has found new converts among youth, according to market research (Holtermann, 2024).

As a reader, I found some word choices repetitive and irritating that were sprinkled throughout the text, (e.g., in writing about frankincense, on p. 5, "the hostile deserts of the Arabian Peninsula"; on p. 19, "harsh desert"; another on p. 19, "hostile stretches of desert"). As a researcher, I have found serenity in each of the deserts where I have spent time, in Mali, Morocco, Namibia, Sudan, Syria, and Yemen.

It was alarming that in the discussion of Indonesian clove cigarettes called *kretek* (p. 75), their adverse consequences are not mentioned. "The smoking of clove cigarettes has been associated with thirteen cases of serious illness in the United States, including hemorrhagic pulmonary edema, pneumonia, bronchitis, and hemoptysis. After she smoked a clove cigarette, a patient developed pneumonia complicated by lung abscess. Her lung disease may have been caused by aspiration pneumonia as a consequence of pharyngolaryngeal anesthesia from clove cigarette smoke. Clove cigarettes appeal to adolescents experimenting with smoking practices and may influence the development of later smoking habits" (Guidotti et al., 1989). "Side effects of this alkylphenol on human and animal health have been known for decades" (Özbek and Ergönül, 2022).

This book might be a desirable choice for public library acquisition, appealing to an audience of gardeners and readers who enjoy historical and contemporary sketches about fragrant plants.

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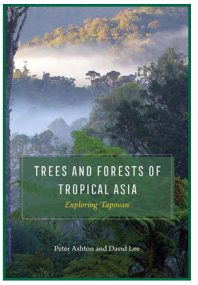
Trees and Forests of Tropical Asia: Exploring Tapovan

Peter Ashton and David Lee
2022. ISBN: 9780226535692
$45.00 (paperback); 448 pp.
Chicago, University of Chicago Press.



This book provides a detailed overview of the forests of South and South-east Asia based on the exceptional ecological experience gained by Peter Ashton, initially in the service of post-colonial governments in Brunei and Sarawak and, of key importance, working with Indigenous Iban colleagues in Borneo. This transformative experience, that few alive today now have, has been followed by decades of subsequent research in the region. The book is a slimmed down version of an earlier majestic tome: *On the Forests of Tropical Asia: Lest the Memory Fade* (Ashton, 2014), which provided a huge amount of information but, despite being lavishly illustrated, is an imposing book in its size, volume of text, and price. In this new *Trees and Forests of Tropical Asia: Exploring Tapovan*, Peter Ashton is joined by David Lee, who had experience of teaching and researching in Peninsular Malaysia early in his career, and also had decades of research experience in the region, particularly from some years in India. Sadly, David passed away shortly after the book was published, so it will become a fitting tribute to much of his work. The *Tapovan* ("forest wisdom") subtitle is likely David's, and he has clearly added additional insights on the Indian sub-continental forests.

Tropical Asia is of particular interest to many ecologists because: "mighty tectonic events have created a terrestrial setting of enormous complexity for the evolution … of plants throughout the Asian tropics, a setting that is in stark contrast to the relative stability of the other two major tropical continents." In exploring the diversity and complexity of forests in tropical Asia, the book starts out with chapters setting the background on climate, geology and soils of the region. These then lead on to the main chapters that broadly explore: (1) the diversity and geography of different forest formations, (2) aspects of forest functional ecology, (3) explanations for the high species diversity in this region, and (4) human-forest interactions. The chapters on the geography of forest formations are extensive and outline the different forest types, including quite detailed explanations for why certain forest types are found in a given location. Whilst plants/trees form the backbone of the text, this is supported by the functional ecology chapters that link plants and animals, looking at pollination biology and seed dispersal, for example, and plants and fungi when looking at the importance of mycorrhizal associations. These are then followed by chapters on historical biogeographical reasons for the contemporary patterns of species diversity, which are complemented by those that look at the maintenance of species diversity. Drawing on their broad experience, Ashton and Lee clearly advocate for the role of niches, and particularly edaphic niches, in contributing to the maintenance of Asian tropical tree species diversity. The importance of permanent sampling plots in supporting this work is also clearly outlined. The final set of chapters examine various aspects of the interactions between people and the forests of the region. I found the explanation and history of the Malayan Uniform System, a sustainable form of forest management, to be particularly interesting. Shortly after the system was formally established, economically valuable commodity crops became a land-use priority in the region paving their way to become the dominant force in the clear patterns we see today of removal of forest for plantation crops.

There is certainly something of interest for everyone in the material presented here. Whilst the book is aimed at graduate students, as noted on the cover, a quite-detailed geographical knowledge of the region is assumed, and one would also need a quite high-level geological background to fully appreciate the geological aspects of the text. Given that much of Ashton's work has been on the relationships between soils and tree species composition, it is surprising that his description of soils is often unclear, using terms such as 'raw humus' and 'red-yellow podzols' that are difficult to put into a formal, or taxonomic, context. Since Ashton has considerable experience in plant taxonomy, having produced accounts of the Dipterocarpaceae (they key family in the region) for Flora projects, notably *Flora Malesiana* (Ashton, 1982) and the *Tree Flora of Sabah and Sarawak* (Ashton, 2004), it is somewhat surprising that he does not use more formal terms for the soils described in the book. This might not be a point of key importance for readers of the *Plant Science Bulletin*, but Schimel and Chadwick (2013) make a clear case for describing soils correctly to allow meaningful comparisons between studies. A final note for improvement is that a number of the illustrations often have poor resolution and, when combined with small font size, makes it difficult to read some of them. This is likely a consequence of cheaper production making the price of the book more suitably accessible to a broad range of students and researchers, particularly within Asia.

In conclusion, this book provides an accessible overview to the forests of South and Southeast Asia by two ecologists with unrivalled experience in the region. It provides a lot of useful information across a range of relevant topics but does assume a certain amount of geographical knowledge of this part of the world. Although production is cheap (e.g., poor-quality figures in places), this will make it accessible to a broad range of researchers, which is to be commended.

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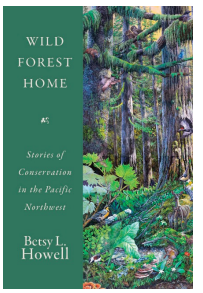
Wild Forest Home: Stories of Conservation in the Pacific Northwest



Betsy L. Howell
2024. ISBN-10: 164769194X; ISBN-13: 978-1647691943
US$24.95 (paperback); 312 pages
University of Utah Press

This book consists of 25 essays by the author on her experiences studying the ecology of old-growth forests of the Pacific Northwest. She grew up among these unique forests and first started working for the U.S. Forest Service in 1986—and continues to work for the Forest Service today. These essays capture her scientific, naturalist, and personal struggles. The author describes her spiritual connection to the old-growth forests in Oregon and Washington, and how living

and working in this region has uplifted her personal life.

In the first section, the author introduces the different forest regions in Oregon and Washington. On a personal note, she mentions how her father's alcoholism shaped her early life. There also is an interesting discussion on how better to persuade the public toward conservation (or toward anything!): scientific data or stories. The latter always wins, and she tries to incorporate both in her essays.

Part I in the chronological order in her book takes place in Oregon—primarily in Mt. Hood and Siskiyou National Forests. She recounts her involvement with conservation controversies with a number of species, including the infamous stories surrounding the spotted owl ecology. As she prepared to leave Oregon for Washington, she had to deal with many personal struggles including her own potential problem with alcoholism and mental illness as well as identifying her sexual orientation. She navigated these choppy waters successfully and started developing her writing skills.

Part II consists of her time in Washington where she first worked as a field biologist at Olympic National Forest. In this role the author was involved in management techniques for the old-growth forest as well as preservation of several native species of animals such as the ensatina salamander. She also fondly discusses her personal and professional relationships with many others that have worked for the U.S. Forest Service. Part III contains essays that reflect on some of the earlier issues she encountered in her 30 years at the U.S. Forest Service as well as some contemporary issues such as fire management in the forest.

Anyone who has traveled in the old-growth forest among giant trees does get a sense of the spiritual connection of this region, and this region clearly has had an effect on me. I particularly love the temperate Hoh Rain Forest (Biosphere Reserve designation by UNESCO) found in Olympic National Park. Thus, I appreciated reading the wonderful essays in this book on both the personal and professional aspects of her life. I recommend it to biologists, ecologists, naturalists, and those interested in the Pacific Northwest.

–John Z. Kiss, Florida Institute of Technology; jzk@fit.edu

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