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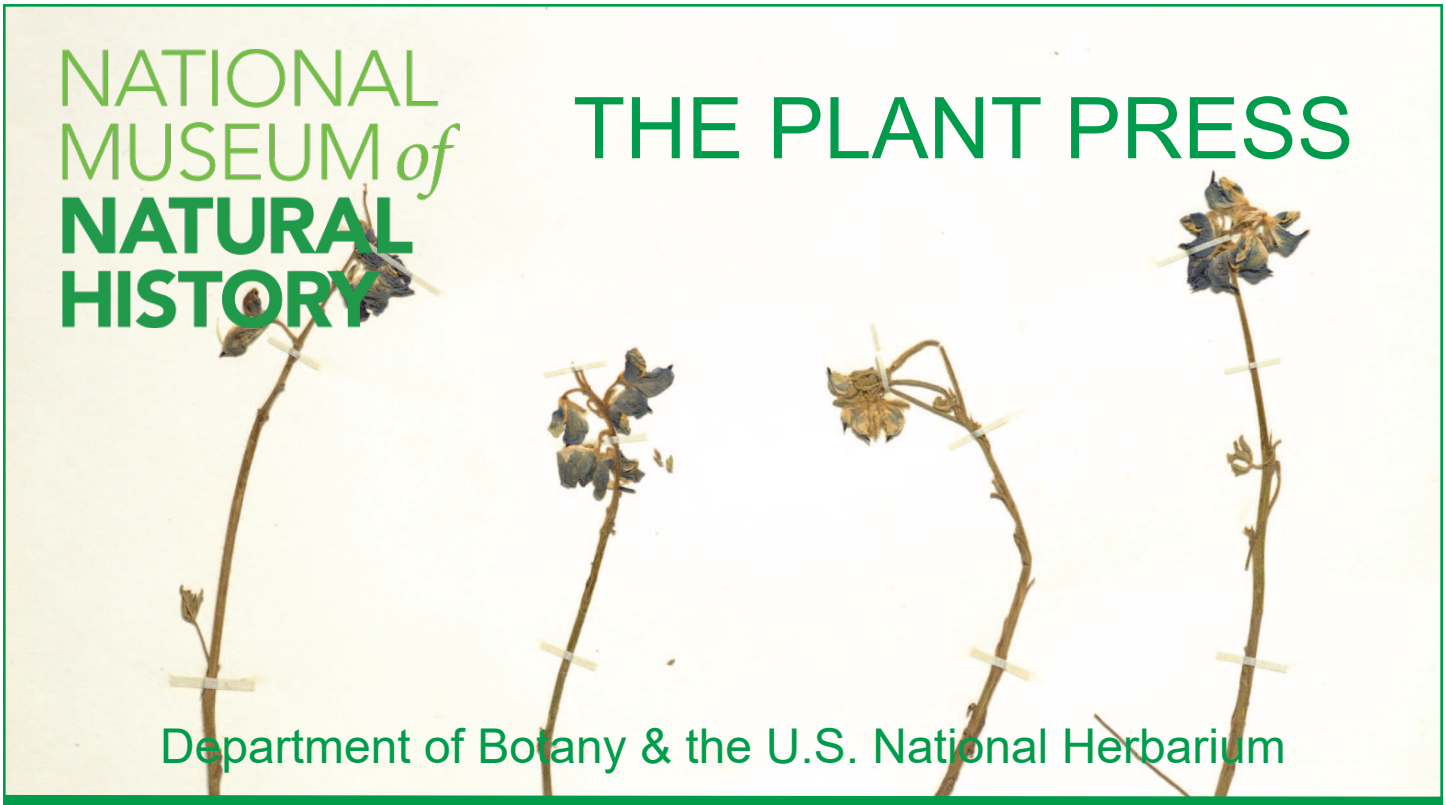

Department of Botany & the U.S. National Herbarium

New Series - Vol. 28 - No. 3 July-September 2025

Back to the future: A new vision for collections-based science is the focus of symposium

By Gary A. Krupnick

The Smithsonian's National Museum of Natural History (NMNH) Department of Botany, the United States Botanic Garden (USBG), and the Smithsonian Gardens held the 22nd National Botanical Symposium, "The Future of Collections-Based Plant Science," on May 16, 2025. The hybrid event brought together five engaging speakers who presented their research to an in-person audience and a virtual audience from around the world. Scientists from universities, herbaria, and botanic gardens spoke about how the goals, missions, and objectives of these institutions are adapting to a modern era while stewarding important preserved and living collections. This symposium brought a fresh outlook into a new vision for collections-based plant science.

Jun Wen, NMNH Curator of Botany and Chair of the Department, welcomed the audience to the symposium. Rebecca Johnson, the CW Whitney Chief Scientist and Associate Director for Science at NMNH, highlighted the mission of the Smithsonian as well as the immense collections housed in the museum and especially the U.S. National Herbarium. She spoke of how the collections from the U.S. Exploring Expedition of the 1830s were the foundation of the museum's collections, and how the entirety of the herbarium's pressed plants is fully digitized and can be used in innovative ways. Susan Pell, USBG Executive Director, also provided opening remarks and spoke of the living specimens from the U.S. Exploring Expedition that still live today at the USBG. Pell spoke about the garden's history, a description of the living collections, their scientific research, and their scientific and conservation partnerships.

Laurence Dorr, NMNH Curator of Botany, presented the

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"To accelerate training in taxonomy, we need to move it from a solitary activity into taxonomy being a team sport."

- Lúcia Lohmann in her talk, "Biodiversity and Innovation: Bringing Herbaria to Their Full Potential."

Symposium

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José Cuatrecasas Medal for Excellence in Tropical Botany to Lynn G. Clark, an accomplished professor in the Department of Ecology, Evolution, and Organismal Biology at Iowa State University and Director of the Ada Hayden Herbarium in Ames, Iowa. In addition to a biographical sketch focusing on her taxonomic work of tropical bamboos, Dorr also highlighted Clark's volunteer work in the U.S. National Herbarium during her summer breaks as a high school student. Her connection to the herbarium, Dorr concluded, gave Clark a unique familiarity with the Smithsonian compared to past Medal awardees. Accepting the award, Clark gave thanks to her parents, who were in the audience. She also remarked about how we need to continue to speak up for our collections and our research and for biodiversity.

The first presentation was delivered by Lúcia Lohmann from the Missouri Botanical Garden. She opened her talk, "Biodiversity and innovation: Bringing herbaria to their full potential," with a broad description of how herbarium collections are important as a key source of botanical data and how they are windows into the past. She emphasized that with the current rate of biodiversity loss, the immense value of herbaria is only going to increase over time, and that collections are still an untapped resource in conservation research.

She described four key steps that can accelerate that rate of taxonomic research. First is to increase accessibility by digitizing herbarium collections. Second, high-quality species identification can increase with the use of new technologies such as hyperspectral scanning and machine learning. The third step is to synthesize data into unified platforms. One attempt, the World Flora Online, is working well as a network for taxonomic experts. But Lohmann would like these online collections to be places where everybody interested in plants could go and find the information that they need, including all the extended specimen data, such as photographs, distribution data, tissue samples, DNA extractions, evolutionary analyses, and so forth. The final step is distributing data to diverse stakeholders, bridging academia with government and society, and bringing everybody on board about the importance of nature to help us address global challenges ahead. She concluded her talk by discussing her long-term vision of herbarium research.

Lúcia Lohmann describes the full potential that herbaria can offer in understanding taxonomy, evolution, and biological conservation. (photo by Ken Wurdack)

The second speaker of the day was Emily Coffey from the Atlanta Botanical Garden, who gave the presentation, "The crucial role of botanical gardens in plant conservation." To complement Lohmann's presentation about the value of preserved collections, Coffey emphasized the importance of living collections in food security, water scarcity, ecosystem stability, medicines, economic stability, energy, human health, biodiversity conservation, and climate change. She argued that botanical gardens are uniquely equipped to be part of the solution by combining horticultural and scientific expertise with the physical infrastructure needed to care for some of the world's most imperiled plants, growing awareness among the public, and bringing together scientists, policymakers, and community members around a shared goal of safeguarding plant diversity for future generations.

Coffey made the bold argument that there is no technical reason why any plant species should become extinct. She says that we have the tools, but we lack alignment—we need to shift how our resources are allocated, from a deeper investment in capacity building to a shift in our collective priorities, such as funding. She spoke about four current challenges in ex situ

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***On the cover*: A specimen of *Lupinus nanus* (Fabaceae), collected in 1934 by "Mrs. C.D. Walcott and Mrs. Herbert Hoover." During Rebecca Dikow's presentation at the 22nd National Botanical Symposium, she explained that while a database might give collection attribution to Charles Walcott and Herbert Hoover, the specimen was in fact collected by their wives, Mary Vaux Walcott and Lou Henry Hoover.**

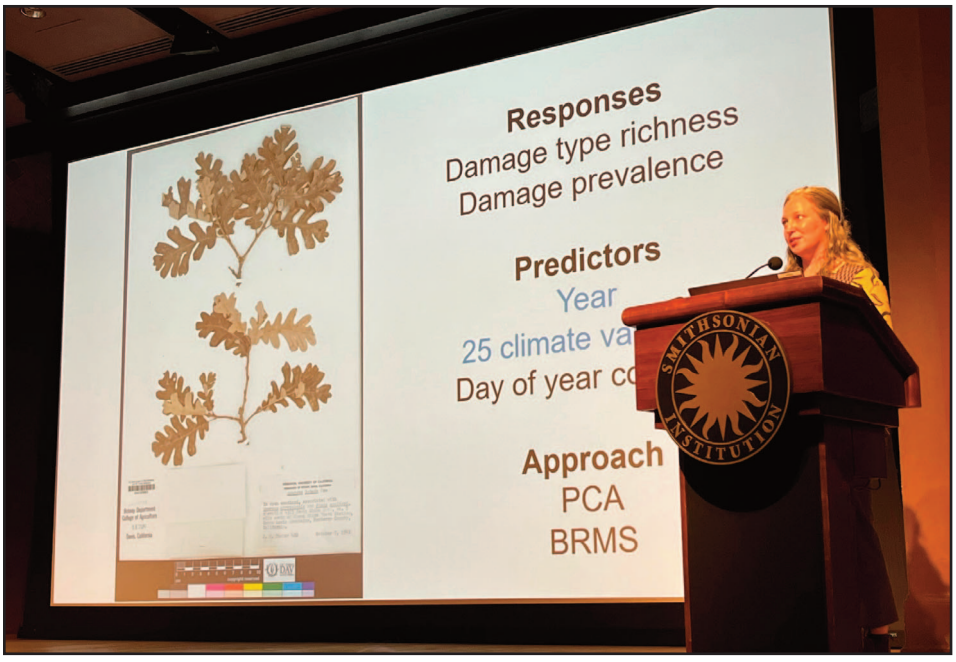
conservation: (1) prioritizing endangered species, (2) integrating with in situ conservation, (3) overcoming challenges of germination and cultivation, and (4) maintaining genetic diversity. On that final challenge, she offered a solution: metacollections—a collection of collections, or a group of institutions working together to collectively prevent extinction and to steward collaboratively their collections of many species. She concluded with a list of how individuals can help prevent plant extinction.

Emily Meineke from the University of California Davis spoke about "Herbivory through the ages: Applying paleoecological methods to herbaria to investigate modern global change." She focused her talk on how insect herbivores respond to the ways in which humans are changing the environment, from climate change and pesticides to land use change and the loss of host plants, and we can see that response in herbarium collections. The two questions that motivate Meineke's research are (1) has herbivory changed over the past century, and (2) are insects declining uniformly? Herbarium specimens are a promising resource to reconstruct these historical interactions over time, Meineke explained, since insect leave characteristic marks when they feed on plants. In one study, Meineke found the prevalence of herbivory on specimens increased from 1896 to 2008 across four northeastern U.S.

Emily Coffey discusses the crucial role of botanical gardens in plant conservation. (photo by Ken Wurdack)

plant species, and that for three of these species, herbivory increased with rising winter temperatures. The increase in herbivory can be explained through the expansion of insect ranges or through higher abundances of native insects with warmer winters.

Meineke next asked about whether insects are declining uniformly. She spoke about a study which her team identified and quantified insect damage to leaves of valley oak, *Quercus lobata*, in California from 1901 to 2022. They found that like in New England, herbivory is increasing over time in valley oak; climate warming in summer is partially responsible, along with other factors like the introduction of non-native species; insect richness on valley oak is increasing over time; and some insects seem to require winter chilling that fuels diapause. An important take away, she explained, is that insect decline does not necessarily yield decreasing herbivory on plants. Abundant plants still support their insect herbivores. Many insects are declining because they are losing access to their host plants. She concluded her presentation by being grateful for the curation of museum specimens.



Emily Meineke speaks about the use of herbarium specimens in understanding changes in insect populations through the ages. (photo by Gary Krupnick)

Richard Primack from Boston University presented a comparable study, "The promise of digital herbarium specimens in large-scale phenology and climate change research." For the past 20 years, Primack and his students and colleagues have been investigating the effects of climate change on plants using herbarium specimens. Using plants grown at the Arnold Arboretum, they have been able to compare springtime observations of plants in full flower today and compared them to the timing of flowering noted on herbarium specimens of the exact same plants in previous decades. They found that plants are flowering earlier over time, and they are flowering earlier in warmer years. The

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Symposium

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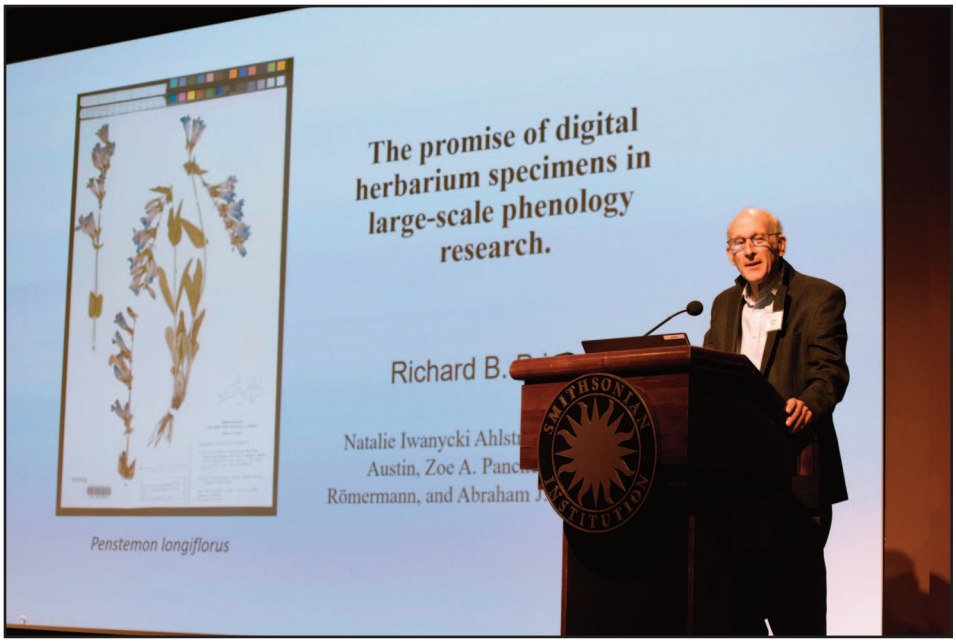
same pattern holds for the timing of leafing out for trees, and the same pattern holds across space for plants in Asia, Europe, and North America.

Primack described the results from studies performed colleagues in the topics of hysteranthy (flowering before leafing out), sex-differences in flowering phenology, and the effects of urban ecology on phenology. He then covered how they are combining historic specimen data with modern iNaturalist photograph data, in which this relatively recent citizen science network has generated a huge amount of data. He concluded his presentation by pointing out the importance of recognizing biases and then discussed important future directions related to key questions in ecology and evolution, the expansion of digitization efforts and analyses, the improvement of the quality and pace of data collection, and the increase in the standardization of taxonomy.

The final invited speaker of the day was Rebecca Dikow from Yale University, who spoke about "Connecting the dots: people, data, and natural history collections." She focused her talk on how digitized specimens can not only tell us the story of science but also the people who did it. She explained that we may overlook the contributions of certain scientists, particularly historical women, if we only focus on published papers and awards. She began by first discussing the life and work of Mary Vaux Walcott, a botanist, artist, and philanthropist, who was married to Charles Doolittle Walcott, a former Secretary of the Smithsonian Institution. The efforts to uncover Walcott's work was primarily due to the efforts of Smithsonian botanist Vicki Funk and archivist Effie Kapsalis who helped develop the Funk List, a list of Smithsonian women in science. In the case of Walcott, Dikow showed two species collected on the same trip by Walcott, with one label showing "Mary Vaux Walcott, July 1937," and the other showing "Mrs. Charles C. Walcott, 1937." The digital database, however, listed M.V. Walcott for the first specimen, but C.D. Walcott for the second specimen. Dikow showcased several more examples where the digital archive showed as if specimens collected by women had been collected by their husbands instead.



Richard Primack delves into the use of digitized herbarium specimens in understanding the impact of climate change on plant phenology. (photo by Ken Wurdack)

Rebecca Dikow discusses how modern tools can uncover the hidden figures in historic plant-collecting events. (photo by Gary Krupnick)

Dikow discussed solutions to the challenges of transcription, such as the platform Bionomia which looks at aggregated data from different museums and reconciles those differences in how people's names are written. In one of Dikow's studies, she found that 40 deceased women are now attributed to more than 120,000 specimens across multiple disciplines. Dikow described these specimens taxonomically and geographically. She concluded her talk by emphasizing that GBIF (the Global Biodiversity Information Facility), Bionomia, and the Biodiversity Heritage Library are essential infrastructure to enable the future of collections-based research and that artificial intelligence (AI) and other computational tools depend on good data which depends on people's efforts.

The Symposium wrapped up with a panel discussion moderated by Susan Pell (USBG) and the five speakers. Questions from the moderator and the in-person and virtual audiences included: how important is it to utilize more than one collection

type in the research that you do?; what is the most surprising thing that you have discovered using collections?; are there organizations that utilize citizen collectors for submission to herbaria?; are there efforts to expand images of micromorphological characters of specimens to accompany digitized specimens?; with limited resources, where should priorities lie?; and what is the next big thing in your collections-based research? To hear the fascinating responses to these questions and others by each of the speakers, watch the video recording available on YouTube.

The Symposium concluded with evening events at the U.S. Botanic Garden's Conservatory, including a closing reception and a poster session.

Smithsonian Gardens and Smithsonian Libraries and Archives provided optional behind-the-scenes tours the morning of the Symposium. Both units offered two sessions each and all were well attended.

Staff from the Smithsonian Gardens (SG) led a tour around the NMNH grounds (organized by Eric Calhoun, former SG Supervisory Horticulturist). Marisa Scalera, SG Landscape Architect, along with Sarah Hedean, SG Living Collections Manager, highlighted the completion of a multi-year and multi-agency project: preserving the Smithsonian Gardens Tree Collection along Constitution Avenue outside the National Museum of Natural History. Funded through the Smithsonian's Collections Care Preservation Fund, the project had three components: street tree fencing, soil remediation, and native groundcover plantings. The historic Constitution Avenue elms are cultural elements of Washington, DC's Monumental Core; safeguarding these trees and preserving the space around them had an added benefit of uplifting the Smithsonian's curb appeal.

"When you start looking for something, you might discover something else that's completely different… you often make amazing discoveries."

- Richard Primack, in answering the panelist prompt, "describe the most surprising thing that you have discovered using collections."

Lynn G. Clark, the recipient of the 22nd José Cuatrecasas Medal for Excellence in Tropical Botany, displays her award during the closing reception at the US Botanic Garden. (photo by Debbie Bell)

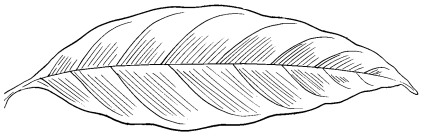
Sylvia Schmeichel, SG Horticulturist, talked about the design of the pollinator garden on the east side of NMNH, and discussed the value of introducing new species to the collections, like the corkwood tree. SG Horticulturist Mike Allen walked the group over to the west side of NMNH to showcase the urban bird habitat area. Here he discussed the care of these living collections: deadheading to encourage more flowering, and allowing plants go to seed/fruit for wildlife food.

The Smithsonian Libraries and Archives hosted a tour of the Joseph F. Cullman 3rd Library of Natural History. Leslie Overstreet, Curator of Natural History Rare Books, and Sydney Fitzgibbon, Library Technician, provided background information about the selected botanical books on display. Overstreet also talked about the uniqueness of the library and the services offered. Participants were able to peruse the books up close to view the detailed illustrations about taxonomy, collecting expeditions, and techniques for transporting plants and seeds.

Attendees were also given a bonus view into the temperature and humidity-controlled vault housed within the Cullman Library where they were able to see Jonathan Singer's *Botanica Magnifica* (2009), a lavishly bound massive double elephant folio volume of 250 photographs of exotic and rare flowers and plants.

The symposium attracted an audience of over 330 attendees, with about 150 people in-person and over 180 people online. Those who viewed the proceedings online watched from 13 countries around the world. All speaker presentations, opening remarks, the presentation of the José Cuatrecasas Medal, and the roundtable panel discussions were recorded and are available for viewing on NMNH's Natural History for Scientists YouTube page <https://www.youtube.com/watch?v=YrUrnbKksIY&list=PLQmxS2U3B6Kbo8GKodMg6FB6K5EHaBaVI&index=34&t=8s>.

The 23rd National Botanical Symposium is tentatively scheduled to take place at the National Museum of Natural History and the U.S. Botanic Garden on Friday, May 15, 2026. The topic is still to be determined. Check the Department of Botany's website for updates.



Lynn G. Clark receives the 22nd Cuatrecasas Medal

The Department of Botany and the United States National Herbarium present the José Cuatrecasas Medal for Excellence in Tropical Botany annually at the National Botanical Symposium to a scholar of international stature who has contributed significantly to advancing the field of tropical botany. The award is named in honor of Dr. José Cuatrecasas, a pioneering botanist and taxonomist, who spent nearly a half-century working at the National Museum of Natural History. Cuatrecasas had a distinguished career devoted to systematic botany and plant exploration in tropical South America, especially in the Andes, and this award serves to keep vibrant his accomplishments and memory. The award consists of a bronze medal bearing an image of José Cuatrecasas on the front with the recipient's name and date of presentation on the back.

This year the 22nd José Cuatrecasas Medal for Excellence in Tropical Botany was presented to Lynn C. Clark, an accomplished scientist, botanist, and author.

Clark is the Director of the Ada Hayden Herbarium and a Professor in the Department of Ecology, Evolution, and Organismal Biology, Iowa State University, Ames, Iowa. More importantly, she is the world's expert on Neotropical woody bamboos and has conducted extensive field work in Latin America. She is more familiar than most medal recipients with the U.S. National Herbarium because as a local high school student she volunteered during her summer breaks with the late Drs. Thomas Soderstrom and Cleo Calderón, also bamboo experts, on various bamboo collections and projects.

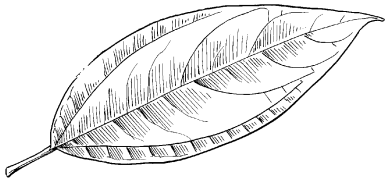
She received a B.S. (1979) in Botany and Horticulture from Michigan State University, East Lansing followed by a Ph.D. (1986) from Iowa State University where she studied with the late Dr. Richard W. Pohl, also a specialist in tropical woody bamboos. Her dissertation was a monograph of a section of the Neotropical bamboo genus *Chusquea* (Poaceae). She joined the faculty of Iowa State University in 1987 and has spent the entirety of her professional career there.

In addition to monographs, Clark has published about 120 new species of grass with many Latin American colleagues, and phylogenies that have contributed to a better understanding of bamboo evolution. She is co-author of the book *American Bamboos* (1999) published by the Smithsonian Institution Press. She is the recipient of numerous teaching and service awards from her university and is richly deserving of wider recognition for her contributions to tropical botany

Laurence Dorr presented the medal to Clark at the 22nd National Botanical Symposium at the National Museum of Natural History in Washington, DC, on May 16, 2025.

Past recipients of the Cuatrecasas Medal are Rogers McVaugh from the University of North Carolina at Chapel Hill (2001); P. Barry Tomlinson from Harvard University (2002); John Beaman from the Royal Botanic Gardens, Kew (2003); David Mabberley from the University of Leiden, The Netherlands, and the Royal Botanic Gardens, Sydney (2004); Jerzy Rzedowski and Graciela Calderón de Rzedowski from Instituto de Ecología del Bajío, Michoacán, Mexico (2005); Sherwin Carlquist from Rancho Santa Ana Botanic Garden and Pomona College (2006); Mireya D. Correa A. from the University of Panama and Smithsonian Tropical Research Institute (2008); Norris H. Williams from the Florida Museum of Natural History and the University of Florida, Gainesville (2009); Beryl B. Simpson from the University of Texas at Austin (2010); Walter S. Judd from the University of Florida at Gainesville (2012); Ana Maria Giulietti Harley from the Universidade Estadual de Feira de Santana, Brazil (2013); H. Peter Linder from Zurich University (2014); Paulo Günter Windisch from Universidade Federal do Rio Grande do Sul, Brazil (2015); Kamal Bawa from the University of Massachusetts Boston (2016); Robin B. Foster from the Field Museum (2017); Alan K. Graham from the Missouri Botanical Garden (2018); Sandra Knapp from the Natural History Museum in London (2019); Sebsebe Demissew from the Gullele Botanic Garden and Addis Ababa University, Ethiopia (2021); Fabián Michelangeli from the New York Botanical Garden (2022); Rafaela Campostrini Forzza from Jardim Botânico do Rio de Janeiro, Brazil (2023); and Peter F. Stevens from the University of Missouri-St. Louis and the Missouri Botanical Garden (2024).

Lynn G. Clark (right) accepts the 22nd José Cuatrecasas Medal for Excellence in Tropical Botany presented to her by Laurence Dorr. (photo by Ken Wurdack)



Abstracts from the speakers of the 22nd National Botanical Symposium

The 22nd National Botanical Symposium, "The Future of Collections-Based Plant Science," was held on 16 May 2025. The invited speakers included botanists, conservation biologists, and scientific curators. Below are the abstracts from the papers that were presented by the invited speakers.

Lúcia G. Lohmann
Missouri Botanical Garden

"Biodiversity and innovation: Bringing herbaria to their full potential"

Herbaria house dried plants, archives, and other botanical materials. As plant species become extinct, herbarium specimens are rapidly becoming the only record of individual species on the planet. Herbarium collections provide irreplaceable documentation of plant life in space and time, enabling studies that are only possible with these carefully preserved specimens. The contributions of herbaria extend far beyond their traditional taxonomic applications; they provide essential infrastructure for diverse scientific inquiries in genomics, climate science, and conservation biology, among others. By supporting cutting-edge research, herbaria have the potential to provide solutions to society's most pressing challenges. Even though herbaria have served as cornerstones of botanical research and education for over a century, they face unprecedented challenges, with their role intersecting broader conversations about resource allocation, research priorities, and institutional relevance. Despite ongoing challenges, herbaria remain at the forefront of modern science, providing unprecedented opportunities in the contemporary research landscape. I review the current state, opportunities, and future potential of herbarium collections, highlighting opportunities for research innovation and what it would take to bring herbaria to their full potential. The future of herbaria is innovative, multi-disciplinary, collaborative, diverse, and bright.

The speakers of the 22nd National Botanical Symposium at the National Museum of Natural History with Susan Pell, panel moderator (from left): Susan Pell, Rebecca Dikow, Richard Primack, Emily Coffey, Lúcia Lohmann, and Emily Meineke. (photo by Ken Wurdack)

Emily Coffey
Atlanta Botanical Garden

"The crucial role of botanical gardens in plant conservation"

The growing loss of plant biodiversity highlights the critical role of botanical gardens in conservation, research, and education. Beyond their traditional aesthetic purpose, botanical gardens are essential to global plant conservation efforts. They serve as living repositories for rare and endangered species, preserving genetic diversity vital for ecosystem resilience and restoration. By cultivating plants that are rare or extinct in the wild, botanical gardens safeguard genetic resources necessary for ecological restoration and the study of plant biology. These efforts support the development of effective conservation strategies. Additionally, their controlled environments facilitate research on plant growth, reproduction, and responses to environmental changes, offering insights that are difficult to obtain in natural settings. Botanical gardens also play a key role in raising public awareness about biodiversity. Through educational programs and interactive exhibits, they inspire understanding and support for plant conservation while encouraging public involvement in preserving biodiversity. Botanical gardens are more than beautiful landscapes; they are indispensable centers of biodiversity conservation, research, and education. Their contributions to safeguarding species, advancing scientific knowledge, and fostering environmental awareness make them vital in combating global biodiversity loss.

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Acknowledgments

The success of the Symposium was due to the significant time and efforts of the following people:

Symposium Organizing Committee: Amy Bolton, Eric Calhoun, Joy Columbus, Laurence Dorr, Rose Gulledge, Carl Johnson, Gary Krupnick, Susan Pell, Lisa Philander, Eric Schuettpelz, Warren Wagner, Jun Wen, and Kenneth Wurdack

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Abstracts

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Emily Meineke
University of California Davis

"Herbivory through the ages: Applying paleoecological methods to herbaria to investigate modern global change"

Global anthropogenic change is reshaping biological communities, driving decline of some species and success of others. Tracking how species interactions shift presents significant challenges, particularly for taxa with sparse or no long-term data. Herbarium specimens offer a powerful tool for reconstructing historical ecological dynamics imprinted in preserved plants, such as herbivory, seed set, pollination, and disease. While herbarium specimens have been increasingly used to document changes in species interactions over time, we lack a clear framework to assess the accuracy of the resulting data. This study advances that framework through re-analyses of existing data and a field study that compares abundance and diversity of insect damage on herbarium specimens against expert assessments in the field. Our results show that herbarium specimens provide reliable estimates of the relative strength of herbivory across plant individuals and species, with trends in expert-derived measurements closely aligning with those extracted from the specimens. Historical plant specimens are now poised to provide unprecedented insights into historical ecological processes how they shift in response to environmental change.

Richard Primack (speaker), Natalie Iwanycki Ahlstrand, Matthew W. Austin, Zoe A. Panchen, Christine Römermann, and Abraham J. Miller-Rushing
Boston University

"The promise of digital herbarium specimens in large-scale phenology and climate change research"

The online mobilization of herbaria has made tens of millions of specimens digitally available, revolutionizing investigations of phenology and plant responses to climate change. We will discuss two main themes associated with this growing body of research, and highlight a series of recent publications exemplifying them: (1) investigating phenology at large spatial and temporal scales, including cross-continental comparisons, and in understudied locations, and (2) testing longstanding theories and novel questions in ecology and evolution that were not previously answerable, such as the differing sensitivities of species and phenological stages to a warming climate. We will then explore strengths and limitations of using digitized herbarium specimens in phenology research, including issues of sampling. (Is it always better to have larger sample sizes?); reliability, transferability, and biases (How might biases in specimen collection, sampling intensity, or digitization affect results?); and ethical and social justice considerations (How can access to digitized herbarium specimens be as fair as possible?). This field will see further breakthroughs as herbaria around the globe continue to mobilize and digitally interlink their collections. New developments will likely come from advances in technology and international collaborations and including understudied regions such as the Arctic and the tropics.

The symposium's speakers participate in a panel discussion (from left): Rebecca Dikow, Richard Primack, Emily Coffey, Lúcia Lohmann, and Emily Meineke. (photo by Gary Krupnick)

Rebecca Dikow
Yale University

"Connecting the dots: people, data, and natural history collections"

Natural history collections are extraordinarily valuable resources for taxonomy, systematics, and ecological and climate change research. As data-intensive research methods proliferate, the aggregation of billions of digitized records from natural history collections across the world can become input for machine learning models that evaluate broad biological patterns among specimens representing diverse species and their associated metadata at a scale that was previously impossible. These data can also provide the basis for the development of predictive tools and summarization techniques, enabling researchers to forecast biodiversity trends, assess conservation statuses, and conduct climate change impact assessments. A less commonly reported importance of collections is their significance recording in the scientific process and evidence of science as a community endeavor. People are involved in every aspect of these collections, as collectors, preparators, identifiers, and species authors. These contributions are not always consistently or accurately identified on specimen labels or in the digitized metadata, however, which impacts downstream analyses. Significant barriers to accurate specimen attribution remain, which disproportionately affect how the contributions of women researchers are recognized. This presentation addresses both strategies for improving data accuracy and consistency as well as the benefits of centering the people in collections-based research.

Converging messages from two professional meetings: Community and collaboration are key for the future of natural history collections

By Erika M. Gardner

There is an urgent need for natural history collections to engage broader audiences. This was the clear message delivered at the 40th annual meeting of the Society for the Preservation of Natural History Collections (SPNHC), held at the University of Kansas in Lawrence, Kansas, from May 27-31, 2025. While outreach has traditionally prioritized classroom engagement, the digitization of collections has increased online visibility. Now is the time to make new groups aware of these resources. Jocelyn Corella (KU Biodiversity Institute), one of the three plenary speakers, emphasized in her talk, "Natural History Collections, A One Health Nexus," that "adult education is where we need to focus our efforts." Professionals, policymakers, administrators, and registered voters represent untapped audiences with influence. Expanding their engagement is crucial. Orphaned collections loom at many institutions due to a lack of administrative knowledge about their holdings. Case in point, after Duke University announced plans to close their herbarium, the science community was outraged. Other long-standing challenges to existing collections persist, such as limited time, space constraints, and diminished funding. Added to these, staffing levels are at an historic low.

Overlapping themes and topics were expressed a week earlier at the 22nd National Botanical Symposium in Washington D.C. on May 16, 2025. According to Lúcia G. Lohmann (Missouri Botanical Garden), in her presentation, "Biodiversity and Innovation: Bringing Herbaria to Their Full Potential," she stated, "we need to find creative and engaging ways to distribute data…virtual data and tools are creating space for collaboration." As AI paves the way forward, opportunities for collaboration in natural history collections will expand. Rebecca B. Dikow (Yale University) mentioned in her talk, "Connecting the Dots: People, Data, and Natural History Collections," that "As we're in this very uncertain time in science, focusing on the community aspect is really energizing." Not only is it energizing, but it is also crucial for a collection's survival.

Reaching wider communities and stakeholders will help build the support needed to preserve collections for the future. Collections will need to pivot outreach efforts and find novel collaborative approaches. This summer, the US National Herbarium will offer hands-on specimen preparation lessons, open to the public. The timing couldn't be any more perfect. The mission of this new public program reinforces the core themes conveyed at recent meetings. Collection management and outreach approaches will need to be refined to fulfill the needs expressed at these meetings.

The 40th annual meeting of the Society for the Preservation of Natural History Collections (SPNHC) took place at the KU Natural History Museum (left) on the campus of the University of Kansas. SPNHC plenary speaker, Daniel Wildcat of the Haskell Indian Nations University (right), gave a presentation, "A Question: What Story Do We Tell about Ourselves in Natural History Museums?" (photos by Erika Gardner)

A new grape subgenus with two new critically endangered species discovered in Mexico

By Jun Wen and Gary Krupnick

In a recent article in the journal *Frontiers in Plant Science* (https://doi.org/10.3389/fpls.2025.1580648), the grape team led by Botany Curator **Jun Wen** (along with A. Quintanar Castillo and M.R. Pace from Universidad Nacional Autónoma de México, Z.L. Nie from Jishou University, China, and fellow Smithsonian botanists **A. Talavera**, **L. Sparreo**, **G. Johnson**, and **G.A. Krupnick**) reported a new grape subgenus, *Vitis* subgenus *Rojovitis*, endemic to Mexico. The discovery was based on recent fieldwork, phylogenomic analyses using both nuclear and plastid genomes, as well as morphological comparisons. The new subgenus was inferred to have diverged early in the evolutionary history of the grape genus *Vitis*, yet phylogenomic analyses support an early hybridization event as the likely mechanism in its origin.

The researchers shows that subgenus *Rojovitis* contains two species, *Vitis martineziana* from Chiapas and *V. rubriflora* from Jalisco, both new to science. In comparison to the two other subgenera of the grape genus (subgenus *Vitis* and subgenus *Muscadinia*), *Rojovitis* is characterized by its red flowers and stems with prominent lenticels. The discovery of the third subgenus in *Vitis*, nearly a century after the recognition of the second subgenus, *Muscadinia*, in 1927, represents a major milestone in the systematic research of grapes and their wild relatives. The team used fieldwork and herbarium data to provide distribution maps and conservation assessments of *V. martineziana* and *V. rubriflora* based on IUCN Red List criteria. Due to small population sizes, restricted distributions, habitat loss and alteration, and the effects of climate change, both species have been assessed as Critically Endangered (CR). These findings highlight Mexico as an important yet fragile region for wild grape resources.

This discovery of a new subgenus with two new species in the economically important grape genus showcases that biodiversity discovery is far from complete today. The biodiversity research community needs to emphasize field exploration, especially in poorly collected regions, in the new age of discovery. The grape and wine industry has heavily emphasized the utilization of *Vitis vinifera* from Eurasia; however, the adaptability of the industry to climate change and pests depends on further exploration of resources within the grape genus *Vitis*. As the early-diverged taxa in *Vitis* may also have involved hybridizations, these newly discovered germplasm resources could benefit humanity and potentially serve as important models for studying adaptation and character evolution. These threatened species, however, urgently need to be protected and properly managed due to extensive anthropogenic pressures.

Vegetative (left) and reproductive (right) characters of *Vitis martineziana*, a newly described threatened grape species from Chiapas, Mexico. Illustrations by Alice Tangerini.

Staff recognition award ceremony and open house

On June 18, the National Museum of Natural History (NMNH) held a staff recognition award ceremony where the Office of Education, Outreach, and Visitor Experience and the Office of the Associate Director for Science recognized some of the outstanding work of NMNH staff in 2024. Among the honors was a 2024 Collections Achievement Award presented to the Department of Botany's Greenhouse Relocation Project Team: **Eric Dirksen** (Greenhouse contractor), **Carl Johnson**, **Sue Lutz**, **J.R. Smith**, and **Kenneth Wurdack**. They were recognized for successfully moving the entire Botany Greenhouse collection from the temporary house to a new facility. The Botany Research Greenhouses are located at the NMNH Museum Support Center (MSC) in Suitland, Maryland.

The 2025 NMNH Research and Collections Awardees. Representing the Department of Botany's Greenhouse Relocation Project Team is Ken Wurdack (second from left), Carl Johnson (behind Wurdack), Sue Lutz (third from left), and J.R. Smith (sixth from right). (photo by Smithsonian Institution)

After the award ceremony, NMNH hosted its first open house at MSC. The event was open to all NMNH staff members where those attending got to learn more about the museum, its functions, and from one another. Most NMNH museum departments and offices, from exhibits and human resources to all of science and more, hosted information booths giving colleagues an opportunity to learn more about their contributions to NMNH's mission. The event was well attended beyond all expectations. The Department of Botany hosted a booth showcasing its important collections with a display of bulky, liquid preserved, and pressed specimens, including coralline algae, cacti, medicinal plants, and items from the very impressive wood collection (the second largest xylarium, or collection of wood specimens, in the U.S. and fifth largest worldwide). A tour of the new greenhouse facility and the living collections was a great highlight and popular attraction. The Botany team who organized the booth and tours included **Eric Schuettpelz**, **Ken Wurdack**, **Carl Johnson**, **Sue Lutz**, **Gary Krupnick**, and **Gabe Johnson**.

From left: Sue Lutz, Gary Krupnick, and Gabe Johnson stand at the Department of Botany booth at the NMNH Staff Open House. (photo by Eric Schuettpelz)

NEW FACES

Madison Conn is an undergraduate Environmental Sciences major at the University of Pittsburgh. This summer, she joined the Department of Botany as an NHRE intern under the mentorship of **Ian Medeiros** and **Eric Schuettpelz**. Working on a project entitled "Population genetics of a species complex in southern African *Xanthoparmelia* (lichenized Ascomycota)," Conn is utilizing DNA, chemistry, and morphology to determine whether the current classification of the *Xanthoparmelia schenckiana* complex aligns with genetic data. In the Ashman and Turcotte Labs at the University of Pittsburgh, Conn has worked with *Lemna* (duckweed) exploring their phytoremediation capabilities and whether duckweed polyploids exhibit increased contaminant tolerance when competing with their diploid counterparts.

Carter Keyworth, an undergraduate Plant Sciences major at the University of California Riverside (UCR), joined the Department of Botany as an NHRE intern working with mentors **Jun Wen**, **Alberto J. Coello**, and **Angélica Gallego-Narbón**. Currently, they are analyzing the phylogenetics, morphology, and geographical distributions of *Cissus* (Vitaceae) species in Mexico, a region which lacks extensive research in *Cissus*. At UCR, Keyworth is a research assistant in Robert Jinkerosn's lab working with genetically modifying crop plants for indoor and concentrated growing conditions. Additionally, they volunteer for Loralee Larios' lab investigating mycorrhizal symbionts with Southern California native flora in post-fire recovery.

Alice Tangerini has two volunteers working on the Botanical Art Collection, **James Morrison** and **Michelle Gates**. Morrison has been working as a volunteer artist in the NMNH Fossil Lab since 2012 for Abbey Telfer, Museum Program Specialist, and in Botany since 2023. His first assignments were scanning the Hughes watercolors, the Krieger cactus seeds, and the Smith and Downs Xyridaceae illustrations, totaling over 200 scans. Currently he is working through all unscanned Poaceae illustrations, many from the Hitchcock-Chase and McClure era. In his spare time Morrison paints in a studio near his apartment, incorporating the images from his Fossil lab drawings and other biological specimens.

Michelle Gates began working as a Botany volunteer in 2024 and has been scanning Norris's collection of algae illustrations including drawings from E. Yale Dawson publications, early anatomical drawings for Smith and Ayensu, and Walpole's historical field sketches from late 1800s. When not volunteering, Gates keeps busy with three school age children and an active career in embroidery and painting.

DEPARTURES

MaryAnn Apicelli has worked in the Department of Botany since January 2001, most of the time as an Administration Specialist. Apicelli retired from her position on April 30, 2025. During her 24 years she worked with department chairs **John Kress**, **Warren Wagner**, **Larry Dorr**, **Eric Schuettpelz**, and **Jun Wen**. She was an integral part of many aspects of operating the department. She was always extremely helpful, responding quickly and efficiently to many diverse situations. She worked creatively to look for the best solution for each issue. She helped the entire department and was always cheerful and considerate.

Prior to joining the Smithsonian, she worked for over 20 years in medical administration and medical assistance in both the federal and private sector. Her federal work began at the DeWitt Army Community Hospital, Fort Belvoir, Virginia in the Radiology Department as a transcriptionist and later as an administrative support assistant (and frequently as a medical assistant) to the Chairman of the Department of Family Practice Residency Program. She also worked for a private practitioner as a physician liaison, an emergency room physician recruiter, and as a practice manager. With a desire to return to the federal government, she applied to the Smithsonian and was

eventually hired into an open position in the Botany administrative office by Kress when he was Chair.

Apicelli is very proud of her time in Botany sharing that her position allowed her to do everything except the science, from calling the plumber to fix a leak, to guiding staff members through the tricky travel system when planning their excursions, to being the point of contact for foreign visitors trying to maneuver through the department and museum, as well as doing the appointment paperwork for fellows, visiting researchers, and contractors. She was the principal liaison for the department chair and meetings and acted for many years as an official timekeeper for the staff. She most enjoyed meeting visitors from all over the world—Myanmar, Brazil, Siberia, China, Japan, Korea, Spain, Venezuela, Mexico, the Caribbean, India, Indonesia, Brazil, Peru, as well as visitors from within the U.S.

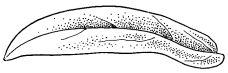
Apicelli said, "I have found it most rewarding to be a part of such important work and to be around such amazing people during my tenure. I am so grateful for such a phenomenal experience as it certainly has been one of the best experiences of my life!"

The Department is grateful to MaryAnn for all that she has contributed to assisting staff, fellows, students, associates, and visitors who have made their way through Botany over the past few decades.


MaryAnn Apicelli


Marilyn Hansel

Marilyn Hansel began working for the NMNH Department of Botany in 1987, first as a volunteer, then a contractor, and back to a volunteer. She has worked on various projects for **Pedro Acevedo**, Aaron Goldberg, the Herbarium Support Unit, and the Biological Diversity of the Guiana Shield (BDG) Program. Hansel says, "It's been an interesting place to work, and I always feel like I'm learning new things — and you know, when you stop learning, it's curtains." For the BDG Program, she database and barcoded historical collections from the Guiana Shield region of South America, filing plant specimens in the herbarium, and other plant related jobs. After the end of the BDG Program and the Covid pandemic, she returned to continue working with Acevedo and **Carol Kelloff** on various collection related projects. In May, Hansel and her husband, John, left Washington, D.C., for their family home in Wisconsin. After over 38 years of working in the Department of Botany we are sad to see them go but happy as they embark on a new adventure.



TRAVEL

Alberto Coello and **Angélica Gallego-Narbón** traveled to New York City, New York (6/26 – 6/30) to work at the herbarium of the New York Botanical Garden where Coello examined specimens of *Cissus* (Vitaceae) and Gallego-Narbón examined specimens of Araliaceae for their postdoctoral research projects.

Stuart Davies traveled to Barro Colorado Island, Panama (4/7 – 4/11) to participate in new ForestGEO Staff Scientist interviews at the Smithsonian Tropical Research Institute; to Klippan, Sweden (5/6 – 5/8) to participate in a workshop on the Global Forest Dynamics initiative and to present a seminar; and throughout Mexico (6/22 – 7/4) to visit several sites for GEO-TREES field work and to attend the 61st annual meeting of the Association for Tropical Biology and Conservation in Oaxaca.

Erika Gardner traveled to Lawrence, Kansas (5/27 – 5/31) to attend the 40th Annual Meeting of the Society for the Preservation of Natural History Collections (SPNHC) and to give three presentations.

Carol Kelloff and **Mark Strong** traveled to Lawrence, Kansas (5/27 – 5/31) to attend the 40th Annual Meeting of the Society for the Preservation of Natural History Collections (SPNHC) and to present a poster by Carol Kelloff, Meghann Toner, and Mark Strong entitled, "U.S. National Herbarium: A Big Move into the Future."

Ana Martínez Becerril traveled to Mexico City, Mexico (6/16 – 6/25) to examine herbarium specimens and to process and describe anatomical sections of rhizomes from the fern genus *Elaphoglossum* in collaboration with Marcelo Pace at the Plant Anatomy and Evolution Laboratory and the MEXU herbarium at the Institute of Biology, UNAM; and to Xalapa, Mexico (6/26 – 7/4) to conduct fieldwork and collect *Elaphoglossum* specimens and fix rhizomes for further anatomical study in the cloud forests in Veracruz with colleagues from INECOL (National Ecology Institute, Xalapa).

Ting Wang traveled to New York City, New York and Boston, Massachusetts (5/29 – 6/7) to examine specimens and conduct sampling at the herbarium at the New York Botanical Garden and the herbarium at Harvard University.

VISITORS

Yali Li, South China Botanical Garden; *Firmiana* (Malvaceae) (9/10/2024-9/3/2025).

Ting Wang, South China Botanical Garden; *Angiopteris* (Marattiaceae) (9/10/2024-9/3/2025).

Milagros Anzuinelli, Universidad de Buenos Aires, Argentina; *Porophyllum* (Compositae) (3/3-4/11; 5/22-5/22).

Sylvie Martin-Eberhardt, Michigan State University; Extrafloral nectary bearing species (3/31-4/4).

Aurora Prehn, Royal Botanic Garden Kew, UK; *Camellia sinensis* (Theaceae) (3/31-4/1).

Richard Dunn, Selby Botanical Gardens; Gesneriaceae. (4/2-4/9).

John Clark, Marie Selby Botanical Gardens; Gesneriaceae (4/14-4/15).

Jenifer de Carvalho Lopes Dantas, Harvard University; *Vellozia* (Velloziaceae) (4/14-4/18).

Fred Barrie, Missouri Botanical Garden; Flora Mesoamericana (4/15-4/24).

Isabella Candido, independent researcher, and **Esteban Ramirez Chueca**, Harvard University; Salicornioideae (Chenopodiaceae) (4/17-4/21).

Erin Sigel, University of New Hampshire; Ferns (4/22-4/24).

Atiles Reis, Universidade Federal do Rio de Janeiro, Brazil; *Asplenium* (Aspleniaceae) and *Diplazium* (Athyriaceae) (4/25).

Kelly Pfeiler, University of Kansas; Cupressaceae (5/5-5/9).

Karina Yanez Aroche, University of Kansas; Nothofagaceae, Fagaceae, Casuarinaceae, Betulaceae, Ticodendraceae, Myricaceae, and Juglandaceae (5/5-5/9).

Paul Niell, Florida State University; Plant collections of the Hispanophone Caribbean (5/6-5/8).

Olwen Grace, Royal Botanic Garden Edinburgh, UK; Asphodelaceae (5/14-5/16).

Alejandra Vasco, Fort Worth Botanic Garden; Ferns (5/14-5/21).

Steven Manchester, University of Florida, Gainesville; Burseraceae (5/15).

Scott Ward, North Carolina Botanical Garden; Graminoids and the southeastern flora (5/15).

Lynn Clark, Iowa State University; Bambusoideae (Poaceae) (5/16).

David Lowry, Michigan State University; Phrymaceae (6/12).

Tilottama Roy, Missouri Western State University; Asteraceae, Lamiaceae, and Scrophulariaceae (6/20).

Cleber Juliano Neves Chaves, University of Miami; *Pitcairnia flammea* (Bromeliaceae) (6/23-6/27).

Zachary Muscavitch, University of Connecticut; Lichenized fungi (6/25-6/27).

STAFF ACTIVITIES

The exhibit, "Orchids in the Wild: The Orchids of Hong Kong, Australia, Asia, and the Pacific Islands," received a Gold Medal at the 2025 Chelsea Flower Show. From left, Phil Seaton, Tom Mirenda, Johanna Hutchins, Benjamin J. Crain, Lawrence Zettler, and Christine Nicholson are just a few orchid specialists who developed the exhibit. (photographer unknown)

A team of orchid specialists gathered in London for the 2025 Chelsea Flower Show to present an exhibit on orchid conservation. The exhibit, *Orchids in the Wild: The Orchids of Hong Kong, Australia, Asia, and the Pacific Islands*, was developed by scientists, horticulturists, and students from over 25 organizations including **Benjamin J. Crain** (Botany Research Associate), Melissa McCormick, and Dennis Whigham from the Smithsonian Environmental Research Center (SERC). The exhibit spread the orchid conservation message to tens of thousands of attendees and ultimately received a Gold Medal from the Royal Horticultural Society.

Stuart Davies gave a seminar about his work with ForestGEO on April 2 to the NASA-GEDI (Global Ecosystem Dynamics Investigation) Science Team at the University of Maryland. He participated in a career day event at Poolesville Elementary School on June 9.

On April 19, post-doctoral fellow **Ana Martínez Becerril** gave a presentation as part of the series, "Empowering Voices: Scientific Talks in Spanish at the National Museum of Natural History." In her presentation, "Los helechos bajo la lupa: secretos y curiosidades de un grupo único (Ferns under the microscope: secrets and curiosities of a unique group)," she spoke about the biology, diversity, evolution, and conservation of ferns. The program consists of a series of scientific talks (in Spanish) designed to bring cutting-edge research to a broad audience (from young teens to adults). Each 20-minute seminar features a NMNH researcher who presents their work in an accessible way.

On May 29, **Alice Tangerini** gave a one-hour webinar, "50 Years of Botanical Illustration: Past, Present, and Future," hosted by the American Society of Botanical Artists (ASBA). Throughout her 50-year career, Tangerini has witnessed significant changes in scientific communication, shifting from physical formats to electronic media. In this presentation, she explored the evolution of scientific illustration, discussing its past, present, and future in the context of adapting to the needs of a prestigious institution. This webinar was well-attended by ASBA members.

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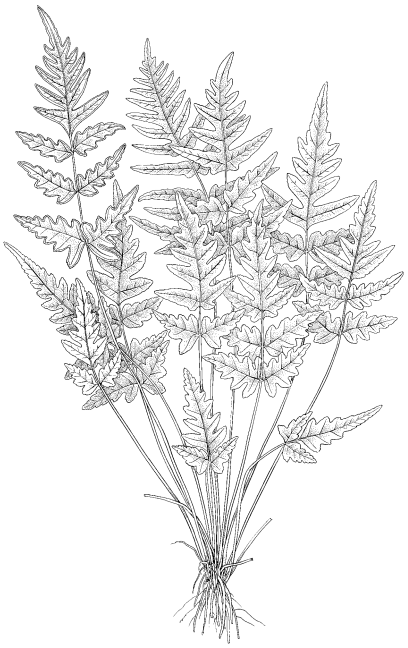
The Plant Press listserv has ended

The Smithsonian LISTSERV server was decommissioned in May 2025. As technology has advanced, the LISTSERV platform presented significant security vulnerabilities that could no longer be corrected to meet modern standards. Due to an urgent security issue, the Smithsonian retired the system quickly.

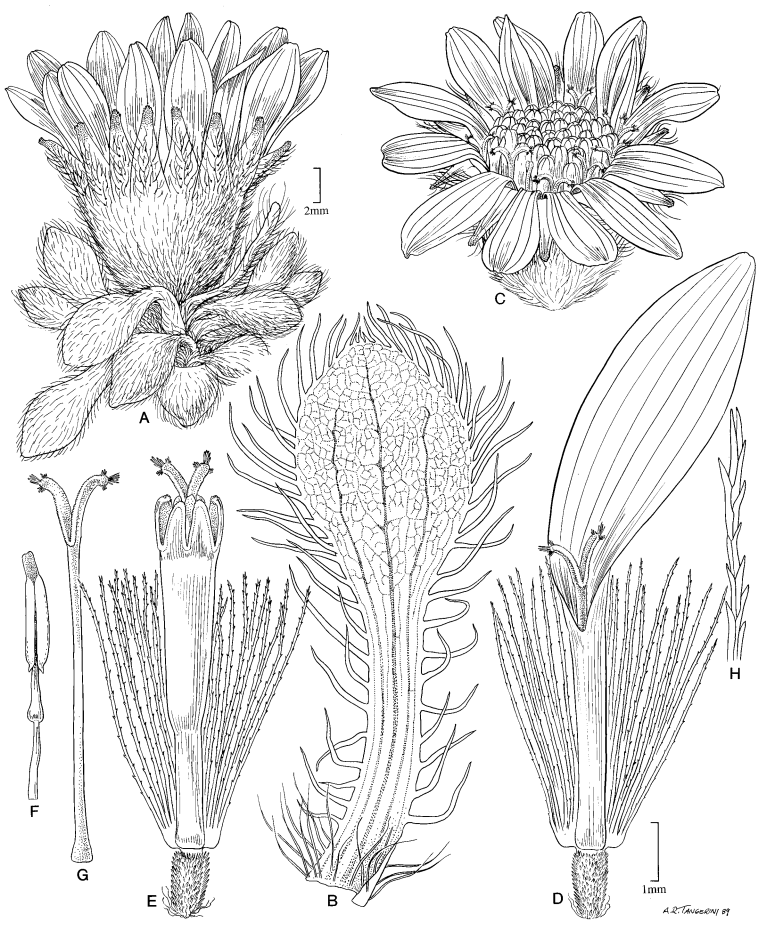
The editor of *The Plant Press*, **Gary Krupnick**, is now maintaining his own list of subscribers and will send quarterly announcements of new issues of *The Plant Press* by email. If you are interested in being added to *The Plant Press* email list, please send your full name and email address to krupnick@si.edu.



ART BY ALICE TANGERINI

Misbrookea strigosissima (A.Gray) V.A.Funk.

The 22nd National Botanical Symposium, "The Future of Collections-Based Plant Science," was held in Washington, DC, on May 16, 2025. Among the talks was a presentation about giving recognition to hidden figures in herbarium collections, such as collectors, preparators, and identifiers. In a 1997 study, Vicki Funk gave prominent recognition to plant collector Miss Winifred M.A. Brooke by identifying a new genus after her, *Misbrookea* (Compositae: Senecioneae). Brooke was an English woman who collected in remote inaccessible areas of Bolivia from 1948 to 1950, (*Brittonia* 49(1): 110-117; 1997). The genus is confined to dry, high elevations in Peru and northern Bolivia. Alice Tangerini used five specimens, including one collected by Funk, to draw three separate illustrations. The drawing of the habit was used in several classes that Tangerini has taught in ink techniques as it was small enough for a one-day session and the story about the name provided additional interest.



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