

The Plant Press



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Collections Spotlight

Doing the Pteridophyte Shuffle Extensive Curation Precedes Rapid Imaging

By Eric Schuettpelz

With well over a quarter-million specimens, the United States (US) pteridophyte herbarium is the largest collection of ferns and lycophytes in the United States (Moran 2001, *Brittonia* 53: 435–436), almost certainly the most substantial in the Americas, and among the most significant in the world. Thanks to funding and in-kind support from the Smithsonian Office of the Chief Information Officer, the Smithsonian Digitization Program Office, the Collections Program of the National Museum of Natural History, and the Department of Botany, a high-resolution image of every specimen in the US pteridophyte herbarium will soon be captured. Eventually, these images will be made accessible to all via the internet (<http://collections.mnh.si.edu/search/botany/>). A future issue of *The Plant Press* will highlight the imaging system (which should be able to handle upwards of 6,000 specimens per day) and the process (which is being overseen by Sylvia Orli). Here, I outline the extensive preparations that have been—and continue to be—made in anticipation of this considerable undertaking.

Thanks to more than a century of continuous curation by William Maxon, Conrad Morton, David Lellinger, and Greg McKee, the US pteridophyte herbarium was in excellent shape at the onset of this endeavor. All the same, there were many aspects of both physical and intellectual curation to be carried out in preparation for imaging. Perhaps most significant

among these was a wholesale update to the higher-level taxonomic sequence. The past two decades have witnessed incredible advances in our understanding of the fern tree of life, thanks largely to phylogenetic analyses of molecular data but also to careful reconsiderations of morphology. This has resulted in new circumscriptions of pteridophyte families and genera, many of which differ substantially from earlier schemes. Reorganizing the pteridophyte herbarium to reflect our current understanding of evolutionary relationships makes it more accessible to users and improves our ability to accommodate future changes.

Referring to the available literature, and beginning with the widely-accepted classification of Smith et al. (2006, *Taxon* 55: 705–731), a new phylogenetically-driven sequence was developed for pteridophyte families and genera. Executing this system meant the combination of some families and genera and the division of others. As an example, four previously recognized families were combined to yield the current Pteridaceae, while the former Dennstaedtiaceae was divided into four families in the new system. Although a few groups escaped unscathed, in most cases reorganization has been a species-by-species process. Often, the requisite moves were not “local” and thus logistically challenging, with large taxa frequently needing to be relocated to new (but already occupied) positions several aisles away. Fortunately, we were able to identify 33 herbarium cases adjacent to

the pteridophyte collection to serve as “swing space” during reorganization, which will also allow for much needed decompression of the collection. The implementation of the new system was spearheaded by Spencer Goyette, Greg McKee, and Mike Tornabene, with the assistance of Amanda Grusz, Erin Sigel, and Meghann Toner in carrying out some of the larger moves.

Beyond the wholesale reorganization of the collection at the family and genus levels, we have also been working to consistently apply our regional divisions within each genus. Furthermore, we have been checking to ensure that all specimens are stored in species folders and that species are organized alphabetically within each region.

When imaging of the pteridophyte herbarium begins later this year, a record will be created for every specimen in our EMu (Electronic Museum) collections management system. Initially, each record will only be populated with the image, the specimen barcode, and the name currently applied to the specimen. The assignment of names will ultimately be automated, but requires a considerable amount of up front preparation. Spencer Goyette and Mike Tornabene have been assembling a comprehensive list for the collection and Chris Tuccinardi has been importing names into the EMu system. From there, species folder barcodes (to be read prior to the specimen barcodes as

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Travel

Laurence Dorr traveled to Philadelphia, Pennsylvania (1/13) to participate in a doctoral thesis defense at Drexel University and to use the herbarium of the Academy of Natural Sciences.

Ashley Egan traveled to Pocatello, Idaho (2/9 – 2/13) to visit the Ray J. Davis Herbarium (IDS) at the Idaho Museum of Natural History, Idaho State University.

W. John Kress traveled to New York City, New York (1/15 – 1/17) to attend the American Psychoanalytic Conference where he delivered a paper in a symposium about the Anthropocene; to Panama City, Panama (1/21 – 1/24) to participate in meetings about conservation science; to San Jose, Costa Rica (3/5 – 3/10) to attend committee meetings of the Organization for Tropical Studies; and to Panama City, Panama (3/22 – 3/27) to take part in research meetings and tour the facilities at the Smithsonian Tropical Research Institute.

Rusty Russell traveled to Philadelphia, Pennsylvania (3/12 – 3/14) to attend a

meeting of the Council on Library and Information Resources and to present at the symposium, “Grinnell to GUIDs: Connecting Natural Science Archives and Specimens.”

Laurence Skog traveled to Sarasota, Florida (2/23 – 3/1) to work in the herbarium at the Marie Selby Botanical Garden.

Alain Touwaide and **Emanuela Appetiti** traveled to Athens, Greece (12/15 – 1/15), where they participated in the Dacalbo Project on Greek alchemy at the National Hellenic Research Foundation and analyzed Greek botanico-medical manuscripts at the National Library of Greece. Touwaide delivered three public lectures on the history of Greek and Arabic science with a particular focus on botany: at the National Hellenic Research Foundation (01/08), at the department of Arabic studies of the University of Athens (01/09), and at the Akadimia of Ancient Greek & Traditional Chinese Medicine (01/10).

Warren Wagner traveled to Kauai, Hawaii (3/20 – 4/4) to attend the board meeting and science committee of the National Tropical Botanical Garden, and to conduct research on the Flora of the Marquesas Islands.

Mohammad Vatanparast traveled to Belo Horizonte, Brazil (2/16 – 3/1) to collect legumes from the savanna biome.

Elizabeth Zimmer traveled to Chicago, Illinois (1/7 – 1/8) to attend an editors meeting for the journal *Molecular Phylogenetics and Evolution*.



Visitors

Ning Zhang, Pennsylvania State University; Vitaceae (1/7/13-6/30/15).

Yongli Fan, Xishuangbana Tropical Botanical Garden, China; Pollination studies (1/13/14-1/12/15).

Eduardo Pasini, Universidade Federal do Rio Grande do Sul, Brazil; Compositae (8/18/14-4/30/15).

Carolina Diller, University of Maryland, College Park; Angiosperm pollination (9/2/14-1/31/15).

Craig Costion, University of Adelaide, Australia; DNA barcoding (11/3/14-10/31/15).

Yuejiao Shan, Wheaton, Maryland; Collection management internship (1/5-2/27).

Carolina Moriani Siniscalchi, Universidade de São Paulo, Brazil; *Cresta* (Compositae) (1/5-1/31)

Gabriel Emiliano Ferreira, National Institute of Amazonian Research, Brazil; Gesneriaceae (1/7-2/17).

Sandra Knapp, Natural History Museum, United Kingdom; Solanaceae (1/9-1/10).

Rafael de Almeida, Universidade Estadual de Feira de Santana, Brazil; Malpighiaceae (1/13-2/13).

Dave Gammon, and 12 students, Elon University; Plant conservation and herbarium tour (1/15).

Genise Freire, Universidade Federal Rural do Rio de Janeiro, Brazil; Sapindaceae (1/26-2/26).

Benjamin Carter, Duke University; Bryophytes (1/27-1/28).

Joe Miller, National Science Foundation; Fabaceae (1/27-1/28).

Yeni Rahayu, Bogor Agricultural University, Indonesia; Sumatran *Tetrastigma* (Vitaceae) (2/2-4/17).

Liang Zhao, Northwest A&F University, China; *Dichocarpum*, *Pulsatilla*, *Trollius* and its close relatives (Ranunculaceae) (2/5/15-2/26/16).

Monica Carlsen, Missouri Botanical Garden; Araceae and Zingiberales (2/17/15-2/16/17).



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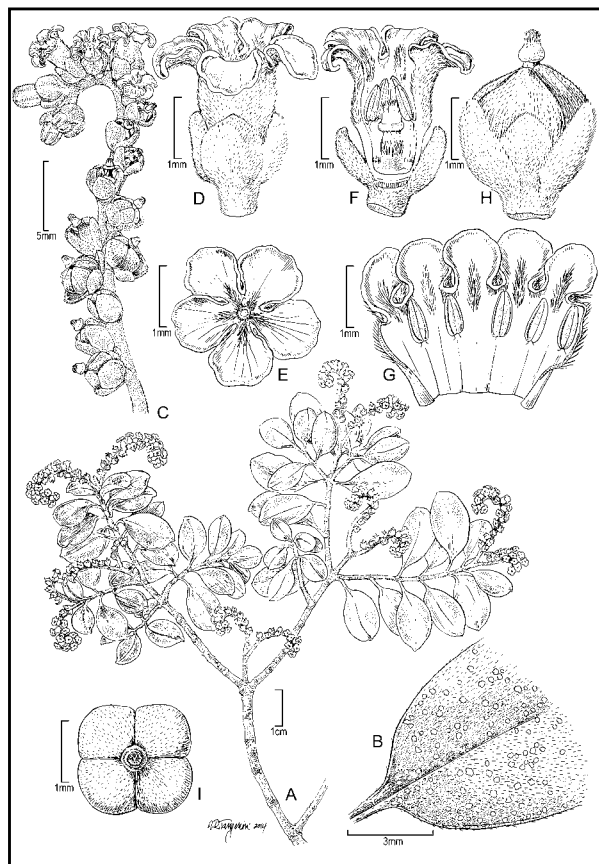
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Completing the Marquesas Islands Flora

The Department of Botany has a long history of foundational biodiversity research. One major way the Department has contributed is through long-term projects to produce floristic analyses for local or regional areas that are intensively explored and documented. These projects have led to an increase in herbarium specimens, DNA samples, images, and community level data, including conservation assessments. For example, the Biological Diversity of the Guiana Shield project has been actively collecting and contributing to research to document, understand, and conserve the biological diversity of the northern part of South America since 1983. On a more local scale the Flora de Guaramacal (Venezuela) project has focused on providing a comprehensive assessment of the plants of Guaramacal National Park. The first volume of the flora, published last year by Laurence Dorr, represents a major publication that will have a broad impact in the northern Andes. Another area of long-held interest is the Caribbean. Pedro Acevedo has taken a major step towards a modern understanding of the regional flora with the publication of *Catalogue of Seed Plants of the West Indies* (Acevedo-Rodríguez & Strong, 2012). This monumental work treats 12,279 angiosperm taxa and is an impressive effort to document this rich flora with 71% endemism. We also continue to provide an up-to-date taxonomy and database of specimen records for the DC flora (<http://botany.si.edu/DCFlora/>), based on



Heliotropium perlmannii Lorence & W.L. Wagner

the work of Stan Shetler and Sylvia Orli.

Smithsonian research in the South Pacific dates back to the U.S. Exploring Expedition, which formed the beginnings of the herbarium in 1846. Some of the most important work was completed by Al Smith on the Fiji Islands, and Ray Fosberg and Marie-Hélène Sachet on the Hawaiian Islands, French Polynesia and Micronesia. In 1988 I initiated a collaboration with David Lorence from the National Tropical Botanical Garden (NTBG). Together we decided a compelling project would be to complete a flora of the Marquesas, building on the previous work of Fosberg and Sachet, and as an extension of the recently completed *Manual of the Flowering Plants of Hawai'i*. The first collecting expedition in 1988 included staff from NTBG, Bishop Museum, the Smithsonian Institution, and the French research organization ORSTOM. During the past 20 years, the project conducted six expeditions to collect throughout the islands, targeting poorly explored islands as well as poorly explored regions on various islands, making 3500 new collections. These were added to the complete Marquesas database with about 11,000 collections of native, naturalized, and cultivated vascular species across a relatively small flora with about 333 native species.

During the course of the current project (since 1988), 56 species new to science have been described primarily by David Lorence, Warren Wagner, and Jacques Florence. Before that, 18 new species were contributed by Fosberg and Sachet, through an expedition by Sachet and Royce Oliver in 1975, the PhD. thesis work of Bryce Decker in mid-1960s, and another 11 by Jacques Florence for the French project to produce *Flore de la Polynésie Française* prior to collaborating with our project. Of these, *Oxalis gagneorum* Fosberg & Sachet (back page) was one of the 18 Marquesan species they described and was among the early illustrations Alice Tangerini made for Fosberg & Sachet. *Heliotropium perlmannii* Lorence & W.L. Wagner (left) is the 85th new species of the project published last month in *Phytokeys*. The most recent species published, it is actually one of the first collections made in 1988 by Steve Perlman on the sea cliffs of the most remote and oldest island of the archipelago, Eiao. These new species, almost all of which are considered endangered because they are local endemics restricted to narrow areas usually on a single island, have increased the known native flora by 25% and are described in over 30 publications by Lorence, Wagner, Fosberg, Sachet, and Florence along with a few with other collaborators. About one half of these were published in two special issues: *Allertonia* (vol. 7, 1997) and *Phytokeys* (vol. 4, 2011).

In addition to these regional taxonomic revisions of the genera and

Continued on page 5

W.L. Wagner

Chair

With

&

View

Warren
L.
Wagner



Staff Research & Activities

On February 28, **Ashley Egan** participated in Invasive Species Awareness Week event held throughout the public halls of the National Museum of Natural History. She hosted a 3-hour activity outside in conjunction with the Discovery Room entitled “Kudzu Characters” where children were able to draw and trace shapes and figures that they found in patches of Kudzu, a highly invasive vine in the southern United States.

On February 19, **Gary Krupnick** participated in a STEM Expo at Earle B. Woode Middle School in Rockville, Maryland. He hosted a table of herbarium specimens and spoke about “Using Botanical Collections to Advance Conservation Action.”

On 20 March, **Robin Everly** and **Gary Krupnick** participated in a nationwide TwitterChat hosted by the Biodiversity Heritage Library (BHL). Experts at participating BHL Member & Affiliate institutions were available online to answer gardening questions from Twitter users. Chat tweets were seen over 13 million times by over 1.5 million people; 155 people actively participated in the chat; and 413 posts were retweeted from the chat.

On January 15, **Rusty Russell** was featured in a Smithsonian Science How live webcast. Titled “Ecosystem Change - Plotting with Plant Collections,” the webcast was about how plant collections can be used to understand change over time. The free 25-minute “Smithsonian Science How” program features the research and personalities of the Smithsonian’s National Museum of Natural History, providing classroom students with positive STEM role models, information about science careers and pathways, and other educational resources.

March 21 marked the 23rd anniversary of the American Association of University Women (AAUW) Career Day in Science for middle school girls in Northern Virginia. **Alice Tangerini** has participated as a presenter each year since the first. The program has the goal of inspiring and

encouraging girls to pursue STEM courses and careers. There were 300 7th and 8th grade girls participating in this year’s program entitled, STEMtastics 2015, held at Northern Virginia Community College in Annandale. Tangerini gave a lecture on illustration in the museum environment and how illustrators work with scientists. This was followed by a demonstration on drawing techniques and a short workshop on drawing in pen and ink using drawing samples from Tangerini’s collections.

In February, **Alain Touwaide** delivered a series of seminars at the US Botanic Gardens, Washington, DC, on the creation and history of botanic gardens. Each seminar was devoted to a specific period and subject: Pompeii (02/06), Cordoba and Granada (02/13), Padua (02/20), and the birth of modern botany (02/27). On 12 February, Touwaide presented a class lecture on medical traditions and ethnobotany at the Center for Complementary and Alternative Medicine of Georgetown University, Washington, DC.

Awards & Grants

The 2014 awardees in the first cycle of the Smithsonian Institute for Biodiversity Genomics-Global Genome Initiative (SIBG-GGI) Grants Program were recently announced. The SIBG-GGI awards seek to promote scholarly activities that advance the vision of Smithsonian Biodiversity Genomics: *An open community dedicated to collaborative multidisciplinary discovery, exploration, and application of genomic information to increase and diffuse knowledge, understanding, and sustainability of global biodiversity*. Among those receiving awards were **Ashley Egan** with a proposal entitled “Phylogenomics of Millettoid/Phaseoloid Legumes: A Global and Genomic Perspective,” **Vicki Funk** with a proposal entitled “Reconstructing Character Evolution in Compositae (Asteraceae) Using Next-Generation Target Enrichment Data (Flowering Plants),” and **Kenneth Wurdack** with a proposal entitled “Understanding the Causes of Evolutionary Novelty: Genomics of Floral and Biochemical Specialization.”

Ashley Egan received a Competitive Grants Program for Science (CGPS) Pell

grant for a proposal entitled “Phylogenomics of Phaseoloid legumes based on a hybrid enrichment approach: Implications for biodiversity, systematics and genomics” to fund a postdoctoral fellow and molecular work.

Alain Touwaide has been appointed as a member of the American Botanical Council’s Advisory Board.

New Faces

Monica Carlsen joined the Botany Department as a Peter Buck Postdoctoral Fellow in February 2015 working with **John Kress** and **Jun Wen**. Carlsen completed both her Master’s and Doctoral studies at the University of Missouri–St. Louis, in collaboration with the Missouri Botanical Garden. Her doctoral dissertation research focused on phylogenetic systematics of the genus *Anthurium* (Araceae), a large (ca. 900 species), strictly Neotropical, aroid genus that has diversified very rapidly and recently. At the Smithsonian she will be working on understanding species richness disparities between the Neotropics and the Asian tropics, using Araceae and Zingiberales



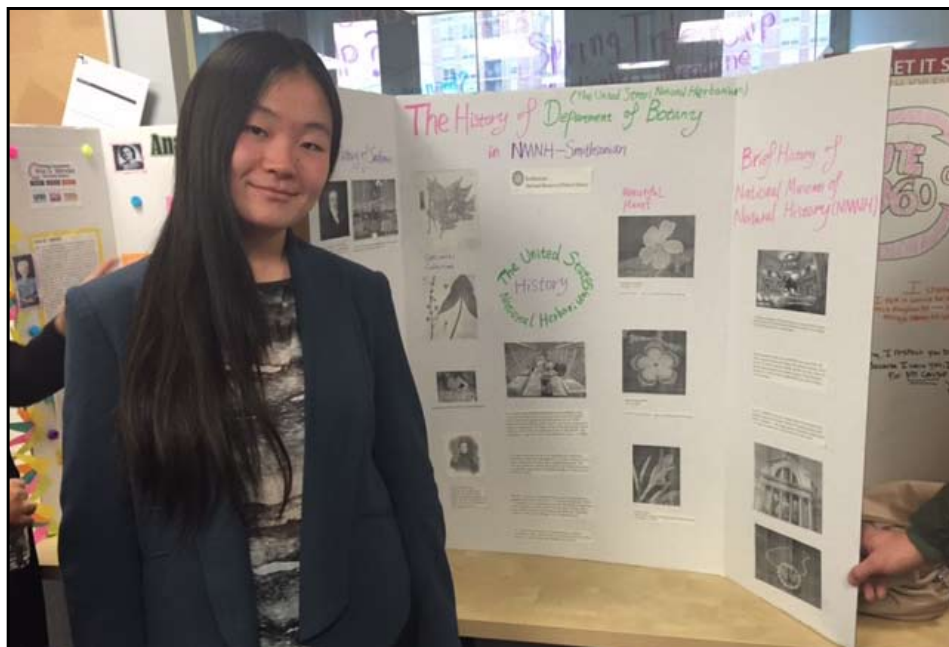
Monica Carlsen (top) and Carolina Moriani Siniscalchi.

as target study groups. Phylogenetic and Next Generation sequencing methods, together with spatial analyses of species distribution models will be used to understand the evolutionary mechanisms (i.e., clade age, and speciation, extinction and diversification rates) and ecological mechanisms (i.e., area availability, habitat heterogeneity, and niche differentiation) thought to affect these worldwide patterns of tropical species diversity.

Carolina Moriani Siniscalchi from São Paulo, Brazil arrived in January to spend three weeks working on her dissertation research. She was the recipient of a Cuatrecasas Fellowship Award offered annually by the Department of Botany. Her thesis is on the “Systematics and Evolution of *Chresta* (Asteraceae).” *Chresta* has 11 species and is nearly endemic to Brazil, but many of the historical specimens are housed in herbaria around the world because several early botanical collectors travelled around Brazil during the 1700 and 1800s. Siniscalchi’s time was spent studying the specimens, taking measurements and identifying some of them. All of these data will be part of the revision of the genus that will be one of the chapters of her thesis.

High School Intern Learns Collection Management Skills

Aleks Radosavljevic and **Melinda Peters** recently had the opportunity to host a winter intern, **Yuejiao Shan**. A high school senior from Maryland, Shan assisted with several special projects and learned basic museum collection management skills during her time here. Shan came to the herbarium through the Maryland Multicultural Youth Center (MMYC) program, an affiliate of the Silver Spring based Latin American Youth Center. The program’s mission is to place interns with mentors based on their academic and professional interests to help prepare them for life after graduation. Radosavljevic and Peters worked with intern coordinator Jessica Cordero to place Shan with them for six hours each week for eight weeks. Their mission was to provide Shan with an overview of the “how, why and what” of museum collections. She learned the basics of “how” to prepare and organize specimens, “why” the herbarium has a



Winter intern Yuejiao Shan presents a poster on the “History of the Department of Botany” at an intern reception of the Maryland Multicultural Youth Center.

collection of dried plants, and “what” the herbarium staff does with them once they are in the collection.

Shan assisted in updating plant names based on annotations matched through TROPICOS, helped with specimen repair, and recorded specimen information that was needed in electronic form so that labels can be generated.

A requirement of the MMYC program is to design a poster and present it at an intern reception among her peers and staff. Shan’s poster was entitled, “The History of the Department of Botany.” Although Radosavljevic and Peters were not able to attend that evening, they know they did one thing right—according to Cordero, Shan said that they opened up her mind to the fact that she too can be a scientist if she wants to someday.

Marquesas Islands

Continued from page 3

addition of new species, the overall project had several goals: to increase scientific interaction among cooperating institutions for further exploration and research within the islands; database specimens and literature; develop a web-based vascular flora [<http://botany.si.edu/pacificislandbiodiversity/marquesasflora/index.html>]; produce the first Vascular Flora of the Marquesas Islands; and provide a framework for preserving the biodiversity of the islands. Now entering its 27th year, the project is moving towards completion and antici-

pates the publication of a comprehensive flora in the near future.

Visitors

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Bo Pan, Xishuangbanna Tropical Botanical Garden, China; *Pueraria* and related genera (Fabaceae) (2/20-4/29).

Lindberg Kelly, George Washington University; History of Bro. H. Ariste-Joseph (2/27).

Dariusz Szlachetko, The University of Gdansk, Poland; Orchidaceae (3/2-3/21).

Westley Knapp, Maryland Natural Heritage; Juncaceae (3/3).

Eduardo Leal, University of Sao Paulo, Brazil; Cyclanthaceae (3/9-3/13).

Elizabeth Tokarz, Yale University; Medicinal plants of Antiquity (3/9-3/20).

Amicia Phillips, Johns Hopkins University; Medicinal plants of Antiquity (3/16-3/20).

David Schaberg, University of California Los Angeles; Mediterranean ethnobotany and ethnomedicine (3/18).

Chelsea McKinley, **Bill McLaughlin**, and **Kyle Wallick**, U.S. Botanic Gardens; Mediterranean medicinal plants (3/20).

Peter Wilf, Pennsylvania State University; Fagaceae (3/27).

Worldwide Family Tree of Grasses is Published

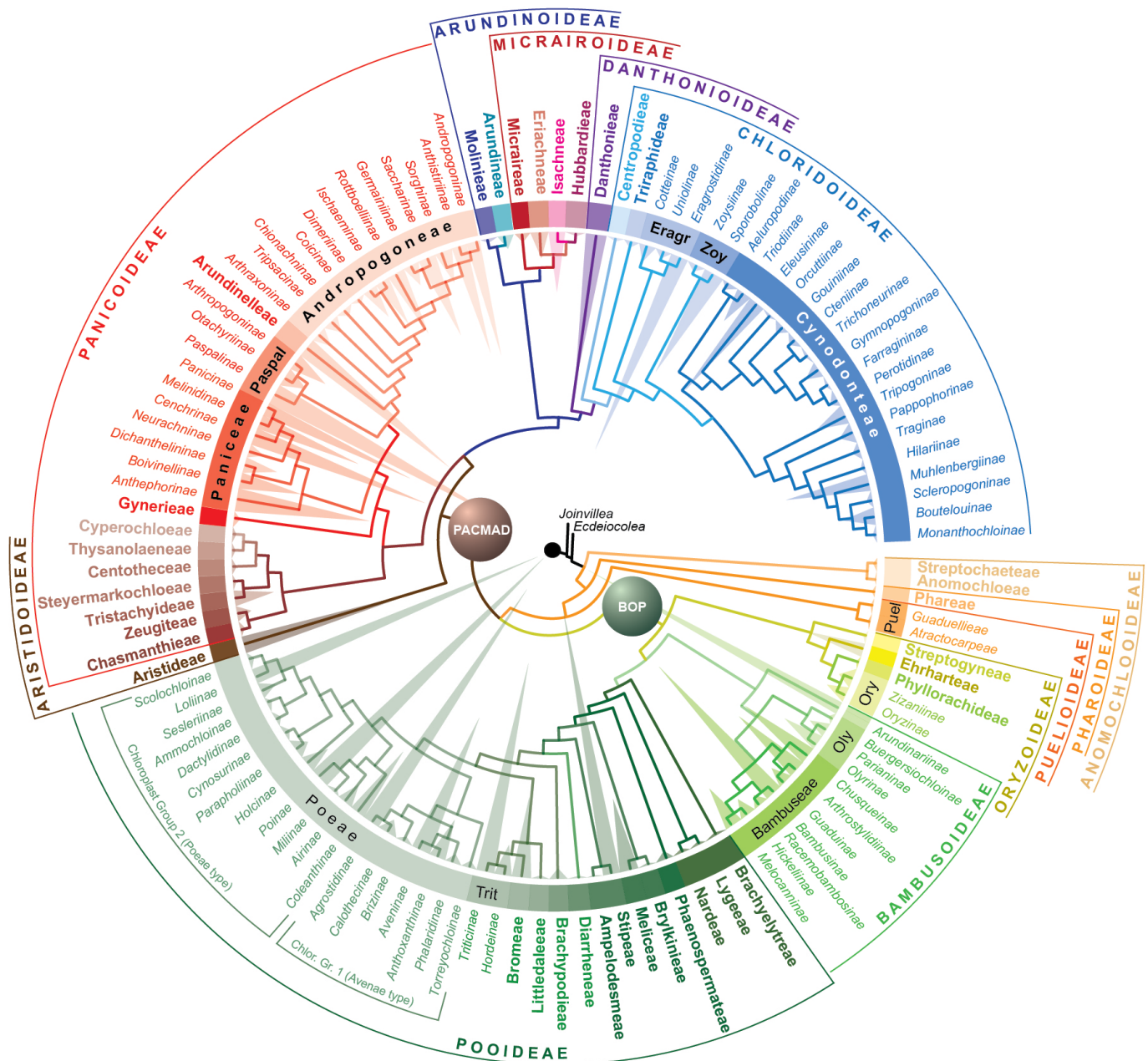
By Robert Soreng, Paul Peterson, and Konstantin Romaschenko

The classification of the grass family Poaceae, including the placement of all currently accepted genera, representing approximately 12,074 species, is presented in a new paper in the *Journal of Systematics and Evolution* (<http://onlinelibrary.wiley.com/doi/10.1111/jse.12150/epdf>).

The last full account of the classification of grass genera was completed by Clayton & Renvoize (*Kew Bull., Add. Ser.* 13: 1-389; 1986), Tzvelev (*Bot. Rev.* 55: 141-204; 1989), and Watson & Dallwitz (*Grass Genera of the World*; C.A.B. International, Cambridge; 1992), all before molecular DNA studies had much impact on our understanding of phylogenetic relationships. With phylogenetic sampling becoming reasonably complete for subfamilies and tribes, the Grass Phylogeny Working Group (*Ann. Missouri Bot. Gard.* 88: 373-457; 2001) published trees and descriptive

accounts of the subfamilies, listing the tribes. The advent of faster DNA sequencing techniques lead to the accumulation of data for many more genera and species, allowing the GPWG II (*New Phytologist* 193: 304-312; 2011) to focus on the frequency and timing of C₄ photosynthesis evolution.

A maximum likelihood tree is provided in the paper representing the new phylotaxonomy of grasses, includes 12 subfamilies (Anomochloideae, Pharioideae, and Puelioideae forming the basal lineages; Oryzoideae, Bambusoideae,



A phylogenetic classification of the Poaceae is presented in a new paper in the *Journal of Systematics and Evolution*. The classification includes 12 subfamilies, 51 tribes, and 80 subtribes evolving clockwise. Triangles are proportional in height to the size of the taxon where the Loliinae is the largest with 698 species.

and Pooideae forming the BOP clade; and Aristidoideae, Panicoideae, Arundoideae, Micraioideae, Danthonioideae, and Chloridoideae forming the PACMAD clade), 51 tribes, and 80 subtribes evolving clockwise (accounting for all 771 genera). Triangles are proportional in height to the size of the taxon. About 41% of the 12,074 species are C₄. All 771 genera are listed and these are colored for a quick assessment of their species indigenous distribution worldwide.



It's Not Just Books: Artwork in the Botany-Horticulture Library

By Robin Everly and Adriana Marroquin

The Botany-Horticulture Library has always been fortunate to feature botanical artwork on loan from the Department of Botany. With the recent redesign of the reading room, there was an opportunity for us to display several illustrations, paintings and photographs in a more organized and pleasing way.

The artwork in the library depicts a variety of plant species in the herbarium and features people important to the library and the Department of Botany. Last April, **Adriana Marroquin**, a former library volunteer, worked with **Alice Tangerini** to document the works. She wrote brief descriptions about several pieces of artwork and wrote biographical

artist sketches. She developed a three-page guide entitled “Guide to the Artwork in the Botany & Horticulture Library,” which is available to visitors to the library. Here are some of the highlights from the guide.

Our most represented artist is Frederick A. Walpole (1861–1904) with eleven pieces on our walls. In the 1870s, Walpole studied under Junius R. Sloan, a portrait and landscape artist based in Chicago. By 1882, Walpole would move west, setting his eyes on Oregon. After moving to Portland, he would work as an illustrator for Lewis and Dryden printing company.

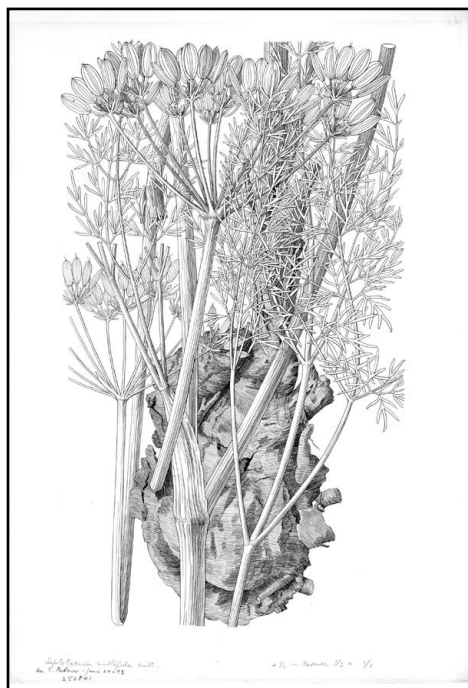
Walpole’s work would take a turn towards the scientific soon after meeting Frederick V. Colville, the Curator of the National Herbarium. Walpole became the Artist for the Division of Botany of the Agriculture Department in September 1896 after he was encouraged by Colville to apply for the position. Though it is unknown whether Walpole had any formal scientific training, he was able to confidently identify specimens in the field and accurately record the details of each in his artwork. He would spend the rest of his life working for the Department of Agriculture, and eventually the National Museum. His work would take him across the country, including Alaska in the summers of 1900 and 1901. Many of the

watercolors found in the library are part of the Pharmacology Collection. These were commission by the Department of Agriculture Bureau of Plant Industry for an exhibition on poisonous plants on display at the 1904 Louisiana Purchase Exposition of St. Louis.

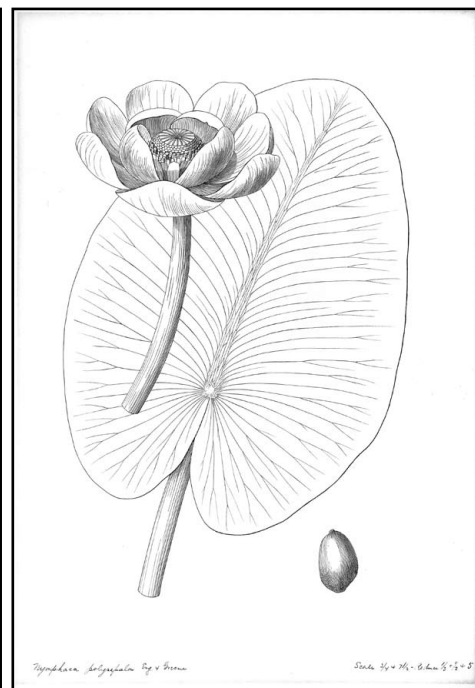
Another featured artist is Mary Emily Eaton (1873–1961). One of her most well-known works, as well as the best represented in the Smithsonian’s collection, are those she created for Britton and Rose’s seminal *The Cactaceae*. Eaton was the principal illustrator for the collection’s many full-color plates. The Smithsonian holds most of her originals for the series, four of which are on display in the library. Many more have been digitized; originals can be viewed on the Department of Botany’s database of botanical illustrations while plates from *The Cactaceae* can be viewed in the Biodiversity Heritage Library.

The library is home to some original artwork as well. A favorite of ours is *Dicranolepis* sp. (Thymelaeaceae) – 2002 by Lester C. Pancoast. This watercolor piece was inspired by a photograph which appeared in the April–June 2002 edition of *The Plant Press*. The original photograph was taken by Deborah Bell, former

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Left: Flowering branch of *Leptotaenia multifida* (Apiaceae) by Frederick A. Walpole. Brush and ink. June 24, 1893.



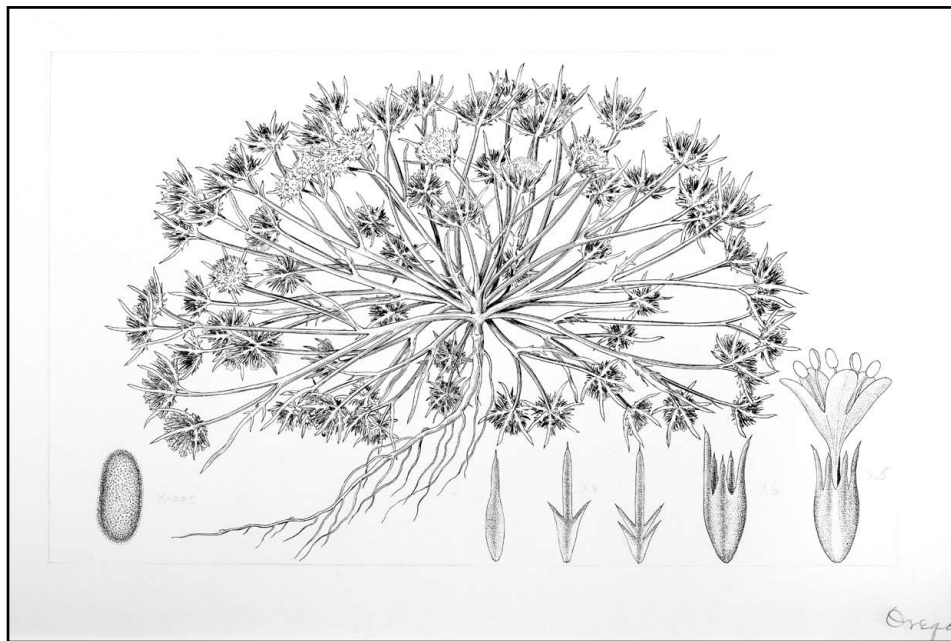
Right: Leaf and flower of *Nymphaea polysepala* (Nymphaeaceae) by Frederick A. Walpole. Brush and ink. ca. 1900.

Library

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Assistant Herbarium Manager, during a collection trip to Gabon. The painting was a gift from the artist, a Florida-based landscape architect. For orchid lovers, we have an oil on canvas of *Paphiopedilum rothschildianum* (Orchidaceae) by artist Patricia Laspino. This painting was a gift to the Department of Botany by the artist. Laspino's focus of interest is floras, particularly orchids.

We also honor several people important to the library and its collections. On a wall near the main desk hangs a portrait of Ruth F. Schallert (1920-2010), the first botanical librarian for Smithsonian Libraries. She served as branch librarian for over 40 years, from the library's beginnings in 1966 to 2007. She became an expert in botanical bibliography, a published scholar, and collaborated with members of the Special Library Association, the Society for the History of Natural History and was a founding member of the Council on Botanical and Horticultural Libraries (CBHL). We also have a portrait of William Archer in the reading room.



Flowering branch of *Navarretia leucocephala* (Polemoniaceae) by Frederick A. Walpole. Brush and ink. Date unknown.

Archer was an economic botanist who, in his later years, donated furniture, books and time to the library. A bequest set up in his mother's honor, called the Catherine Beaugard Memorial Fund, is still used

today to purchase books for the library's collection.

Next time you are visiting the herbarium or library, be sure to take a self-guided tour of the artwork.



1 June 2015: Opening Symposium
2-5 June 2015: Conference Continues

“Next Generation Pteridology: An International Conference on Lycophyte & Fern Research”

In collaboration with the United States Botanic Garden

Supported by the Journal of Systematics and Evolution, the International Organization of Plant Biosystematists, the International Association of Plant Taxonomy, and the Cuatrecasas Family Foundation

The past decade has seen remarkable advances in our understanding of fern and lycophyte biology. New sources of data have emerged and novel methods for analyzing these data are being developed. At the same time, many traditional approaches have been revitalized as their unique and specific contributions are more fully realized. With a recent influx of students and early career researchers, the international pteridological community continues to grow. The pace of scientific discovery is accelerating, new parts of the globe are being included, and the conservation of these important species in a rapidly changing world is being investigated. This conference aims to bring together the world's pteridologists, and others with an interest in ferns and lycophytes, to celebrate the progress to date and to forecast developments still on the horizon.

An opening symposium will kick things off on June 1st at the National Museum of Natural History. Free and open to the public, this symposium will feature invited speakers exploring a variety of topics, from fern genomics and development to horticulture and conservation. An evening reception and poster session at the United States Botanic Garden will provide an informal setting to delve deeper into current pteridological research. The conference will then continue for four additional days of focused scientific talks and workshops.

Register for the symposium, the conference, or both at <http://botany.si.edu/sbs>



An illustration of *Phegopteris hexagonoptera* Fée, by J.H. Emerton and C.E. Faxon, featured in D.C. Eaton's *The Ferns of North America* (1880).

Newly Discovered South Pacific Cliff Flower is Critically Endangered

-Adapted from *Smithsonianscience.org*

What plant species has just been discovered but is almost gone? *Bidens meyeri*—a just discovered flowering plant from the small South Pacific island of Rapa, located in the southernmost part of French Polynesia.

This new species was introduced to science and the public last October in the journal *PhytoKeys* by National Museum of Natural History botanist **Vicki Funk** and her collaborator, Kenneth Wood from the National Tropical Botanical Garden in Hawaii. *Bidens meyeri* grows exclusively on the steep, windswept volcanic cliffs of Rapa. The flower, distinguished by its soft, veiny yellow petals, is named after conservation biologist Jean-Yves Meyer of Tahiti, in part in recognition of his efforts in exploring and conserving the unique biota of Rapa.

Rapa is what botanists call an ‘anoma-



The newly discovered flowering plant *Bidens meyeri*. (Photo by J-Y. Meyer, taken 16 Dec 2002)

lous district,’ meaning it has an unusually vast amount of biodiversity but the origin of the diversity is confusing. According to Funk, her co-discovery of *Bidens*

meyeri, “represents the end of a long line of *Bidens* species that have island hopped their way from western North America to Hawaii to the Marquesas to the Society Islands and ended up on the cliffs of Rapa in the Austral Islands.”

But the beauty of *Bidens meyeri* may not last long. It is regarded as critically endangered and faces a very high risk of extinction in the wild. The reason for this is unconfirmed, but scientists point to several potential factors that contribute to the flower’s endangered existence: climate change, possible fires, destruction by feral goats introduced to the island by humans and competition with invasive plants. This botanical beauty is most closely related to the plant species *Bidens saint-johniana* from nearby Marotiri Island, although it is generally smaller.

Like many new discoveries, finding *Bidens meyeri* was unexpected. Several scientists visited Rapa for a month to take a botanic survey of the island. Due to a logistical traveling complication (the return boat sank), many of the scientists stayed in Rapa longer than anticipated. Scientists discovered several new species during their extended time on the island, including the colorful and cliff-dwelling *Bidens meyeri*.



Conservation biologist Jean-Yves Meyer climbing a volcanic cliff with a specimen of *Bidens meyeri* in his teeth. This plant is known from only a few specimens found on this cliff on the South Pacific island of Rapa. The plant was named in Meyer’s honor. (Photo by R. Englund, taken 16 Dec 2002)

Profile

Continued from page 1

the sheets are imaged) are being produced and attached to each species folder by Amanda Lawrence and Laura Tancredi. Full label data will eventually be acquired via crowdsourcing through the Smithsonian Transcription Center (<http://transcription.si.edu>).

The overall process described above has been ongoing since early last year. Our preparations for imaging have been costly and time-consuming, but are ultimately vital to the success of the project. The various aspects are all on track for completion this summer, but it is important to recognize that these efforts merely represent a “first pass” to be continuously updated and fine-tuned moving forward. Taxonomic changes will continue, which will need to be accommodated. New determinations and corrections will be made as experts visit the collection or borrow our specimens. With images of our specimens soon to be widely available, the pace of change will likely accelerate. Creating digital surrogates of our specimens is not an end, but rather a beginning that extends our curatorial mandate to encompass specimens and data alike.



This specimen, previously filed in *Grammitis* (genus number 150 in the old sequence) and stored in aisle 2 of the United States pteridophyte herbarium has now made its way to aisle 5, where it is filed in *Stenogrammitis* (genus number 288 in the new sequence).



In preparation for rapid imaging, the United States pteridophyte herbarium is undergoing reorganization to reflect the current understanding of evolutionary relationships. Greg McKee (left) and Spencer Goyette (right) work to implement the new system, while Laura Tancredi attaches species folder barcodes. (photo by Eric Schuettelpelz)

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Art by Alice Tangerini

***Oxalis gagneorum* Fosberg & Sachet**

Published in 1981 (*Smithson. Contrib. Bot.* 47), *Oxalis gagneorum* (Oxalidaceae) was drawn in 1978 from the type collections of Betsy H. Gagné 1216, collected from Fatu Hiva, Marquesas Islands. Interestingly, the particular type specimens used could be traced by the photocopies of the unmounted pressed plants from which Tangerini made her sketches and final ink drawing. The three pressed plants became at least two isotype collections. One of the specimens is now an isotype housed at Paris, another is a US isotype. The third copy Tangerini could not match although it may be from another herbarium and not digitized. The habit in the illustration appears as one plant although there seems to be use of a second collection in the placement of some of the branches. The drawing was done in pen and ink on the now obsolete Cronaflex drafting film which has developed a slightly yellow tint from age. Tangerini remembers the drawing of the woody stem as an advance in her techniques to show the texture of bark.



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