

New heights for bryophytes

By Julia Beros

From the Smithsonian Castle to the National Museum of Natural History, the fifth floor to the third, the Bryophyte collection at the U.S. National Herbarium has seen many homes, but is now settling into a more permanent and modern residence. With many specimens still in newspaper and shipping boxes, it is high time that these collections get some extra attention. Through a Collections Care and Preservation Fund (CCPF) award for fiscal year 2017, the Department of Botany received funds to curate and rehouse two groups of specimens: the bryophytes and the algal wet collections.

A bit like packing for a big move, Smithsonian contractors Karen Golinski and Zuvayda Abdurahimova have begun to clear out and inventory the bryophyte cases to prepare and accurately evaluate the collections, which include all of the mosses, liverworts, and hornworts. Beginning just this past October, much has already been discovered about the Smithsonian's long tucked-away bryophytes.

With a legacy set in place by curator emeritus Harold Robinson and his predecessor Bob Ireland, the bryophyte collection has been longing for further curation in the current decade. Though they have not yet been counted, there

are an estimated 125,000 total bryophyte specimens in the herbarium, with approximately 10,000 specimens housed in the off-site Museum Support Center in Suitland, Maryland.

Treasures abound among the bryophytes, including a handful of specimens collected by naturalist Edgar Mearns for the Smithsonian-Roosevelt African expedition of 1909-1910 (while Theodore Roosevelt, in search of specimens for the new Natural History Museum, hunted elephants, Mearns, a naturalist and ornithologist, fervently collected more than 3,000 natural history specimens during this historic expedition). Aside from material collected under the auspices of Smithsonian sponsored expeditions such as the Roosevelt Expedition,

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It's enough for an entire career in these boxes alone.

Harold Robinson, Curator Emeritus

In like a (dande)lion

As 2019 came roaring in, the Department of Botany faced a number of challenges. The year began belatedly due to a 35-day partial government shutdown, the longest in U.S. history, that shuttered the Smithsonian Institution, including every museum and the National Zoo. Our Department's federal staff was furloughed and all research, management, and other work was curtailed. Botany contractors were prevented from working, and visiting scientists were turned away. A skeleton crew was excepted to protect the buildings and ensure the safety and security of specimens and artifacts; we are grateful for their service, while they worked without pay. Retroactive pay provisions were eventually granted for the federal workforce, but regrettably, the department's many contractors were left without pay for that same time period. Needless to say, much excitement filled the air as workers finally returned to the National Museum of Natural History (NMNH), with smiles on their faces, on January 28th.

The second significant challenge facing the Department of Botany was the shuffling of chairs. Late last year, Vicki Funk was selected to serve as the Acting Associate Director of Science for NMNH, but she has since chosen to step down from that role to focus on her health. Laurence Dorr then agreed to serve as Acting Associate Director of

Science while the Museum moves forward with an effort to permanently fill the position. With Dorr on the Executive Team, Eric Schuettelpelz has stepped in as our new Department of Botany Chair. The Department is appreciative of both Dorr and Schuettelpelz for their service to the Museum, and we all wish the best for Funk.

With the Botany staff back at work and our administration settling into their new roles, we are excited about the year ahead. Be sure to read Julia Beros' cover story about the reorganization of the US National Herbarium Bryophyte Collection. This overhaul has the potential to lead to amazing discoveries and important evolutionary insights in mosses, liverworts, and hornworts. Finally, if you happen to be in Washington, DC on Friday, May 17, be sure to register for the 17th annual Smithsonian Botanical Symposium <<http://sbs19.eventbrite.com>>. The theme this year is on plant domestication, and we promise a day of exciting talks, engaging conversations, and insight into the plants that are most essential to human life.



Recipients of the 2019 travel awards

The Department of Botany granted six travel awards for 2019: one Robinson Award, one Smith Award, and four Cuatrecasas Awards. As usual, Botany received many excellent applications from which the awards committee could make selections. The following individuals have accepted their respective awards and will be visiting Botany later this year.

Cuatrecasas Award

Igor Musauer Kessous from Museu Nacional da Universidade Federal do Rio de Janeiro, Brazil, for his project, "Synopsis and re-circumscription of *Vriesea* Lindl. (Tillandsioideae, Bromeliaceae)." His proposed visit is June 2019.

Josimar Kulkamp from Jardim Botânico do Rio de Janeiro, Brazil, for his project, "Systematics and Biogeography of the Subtribe Ditungininae (Euphorbiaceae)." His proposed visit is August 2019.

Sonia Molino de Miguel from Universidad Complutense de Madrid, Spain, for her project, "Taxonomy, phylogeny and biogeography of the genus *Parablechnum* C. Presl (Blechnaceae, Polypodiopsida)." Her proposed visit is September 2019.

Jackeline Salazar Lorenzo from Universidad Autónoma de Santo Domingo, Dominican Republic, for her project, "Untangling the taxonomy of Neotropical Cannellaceae: A taxonomic review with the

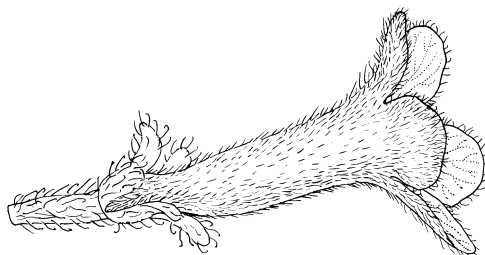
description of new species." Her proposed visit is July/August 2019.

Robinson Award

Joel Calvo Casas from Pontificia Universidad Católica de Valparaíso, Chile, for his project, "Systematics of *Werneria* and *Xenophyllum* (Asteraceae, Senecioneae)." His proposed visit is still to be determined.

Smith Award

Patrícia Steiner Sperotto, from Universidade Estadual de Feira de Santana, Brazil, for her project, "Diversity of climbing plants in the Neotropics: discussing the role of climbing mechanisms." Her proposed visit is July/August 2019.



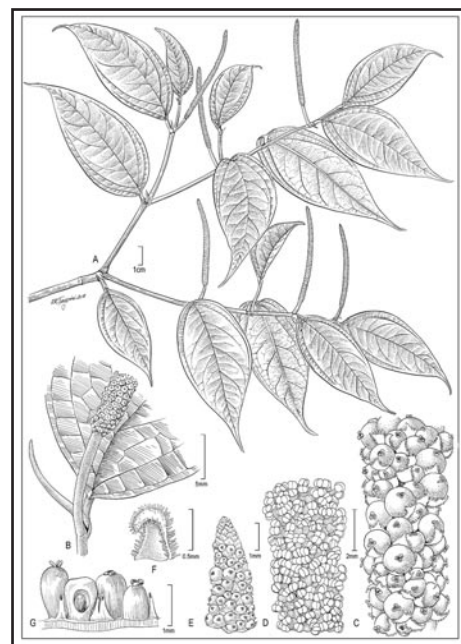


HONORS & AWARDS

The article, "A whole chloroplast genome phylogeny of diploid species of *Isoetes* (Isoetaceae, Lycopodiophyta) in the southeastern United States," by **Peter W. Schafran, Elizabeth A. Zimmer, W. Carl Taylor**, and Lytton J. Musselman, is the recipient of the 2018 Richard and Minnie Windler Award in Systematics. The award was established in 1990 at the annual meeting of the Southern Appalachian Botanical Society by Donald R. Windler of Towson University as a memorial to his parents. The award is presented annually to the author or authors of the best paper published in the journal *Castanea* for the categories of systematics and ecology. A committee comprised of former editors and other SABS members each year select the papers receiving the award. The award was presented to Schafran at a ceremony during the annual business breakfast of the Southern Appalachian Botanical Society during the Association of Southeastern Biologists conference in Memphis, Tennessee on April 5, 2019.

[ABOVE] Recipients of the 2018 Richard and Minnie Windler Award in Systematics are Lytton Musselman and Peter Schafran (at the awards banquet) and Liz Zimmer and Carl Taylor (at the National Museum of Natural History).

Alice Tangerini received a "Highly Commended" for her entry of *Piper sotobosquense* at the 16th annual Margaret Flockton Award Exhibition at the Maiden Theatre, Royal Botanic Garden Sydney. Competing this year were 26 scientific botanical illustrators from 17 countries. The artists employed pencil, pen and ink, purely digital or a combination of digital and traditional media to illustrate the 44 contemporary illustrations entered. Plants of the common garden variety and newly described species were represented. Following the exhibition at RBG Sydney, the high quality giclée prints will be on display at The Australian Botanic Garden, Mt Annan, and The Blue Mountains Botanic Garden, Mt Tomah. More information about the Margaret Flockton Award is available at <<https://www.rbgsyd.nsw.gov.au/whatson/margaret-flockton-award>>.



Alice Tangerini's *Piper sotobosquense* was recognized as "Highly Commended" at the 16th annual Margaret Flockton Award Exhibition at the Royal Botanic Garden Sydney in Australia.



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Bryophytes

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the bryophyte collection at the US Herbarium also houses a great many exchange vouchers, including numerous specimens from Wilfred Schofield's many explorations of the Pacific Northwest. For Bryologists across the globe, the information housed at the Smithsonian has been largely shrouded and overlooked because of its inaccessibility and lack of exposure, and thus the collections have been massively understudied, while the research potential in these collections is huge considering that many are still unidentified.

One such example of an understudied assemblage is a stack of boxes filled with collections made by Walter Koelz. From the 1930s to the 1950s, Koelz made multiple excursions throughout the Himalayas and surrounding regions. Today many of these places are inaccessible because of contentious political conditions, making the specimens extremely valuable for botanical research. Robinson worked on several boxes of this material, noting that the specimens from Kashmir have so much work to be done, "it's enough for an entire career in these boxes alone," after already describing multiple new species and one new genus from the specimens he ex-



Edgar Mearns, a naturalist and ornithologist, collected more than 3,000 natural history specimens, including this unidentified moss from British East Africa (now Kenya), during the historic Smithsonian-Roosevelt African expedition of 1909-1910. (photo by Miguel Montalvo)

amined. Much of the work requires, Robinson notes, careful curation because the collection has been so understudied (and undisturbed). Though past retirement, Robinson, like many researchers at the Smithsonian, continues to produce new work and publish articles at an exponential

rate and recently came in to the herbarium Monday through Friday for several weeks to determine his long-ago collected material from Dominica.

For much of his career, Robinson's focus was on research and taxonomic work as opposed to collecting in the field. He has published papers into the hundreds, and named many new species, with his greatest contributions to bryology being taxonomic work on the families Brachytheciaceae and Hypnodontaceae. A prolific "namer" Robinson gives careful thought to each new specimen he describes: *Nephrophyllus* for "cloud lover," *Ochrobryum crumii* after renowned bryologist Howard Crum, *Mitrobryum koelzii* after one of Koelz's collections, and even the more teasing *Bryoandersonia* (a "julaceous" genus) after his influential and beloved professor Anderson (the naming of which supposedly influenced Anderson to go on a diet). Despite such productive strides in Bryology the work still piled up in the Smithsonian (as with any plant group) and it continues to increase, which is precisely why the Bryophyte collection is due for maintenance.

Before submitting the request for CCP funds, the first task of the reorganization was determining the size of the collection, the general condition of the specimens and cabinets, and the space they occupied.



Smithsonian contractor Zuvayda Abdurahimova has joined Karen Golinski in clearing out and inventorying the bryophyte cases to prepare and accurately evaluate the collections. (photo by Karen Golinski)

Further strategizing, next was to determine the arrangement of the specimens and evaluate the advantages and disadvantages of the existing method of attaching the specimens to herbarium sheets and placing them in folders, in the style of other plant specimens. Former and current collections staff members Melinda Peters and Meghann Toner (respectively) assisted with the CCPF award request, and after Sue Lutz stepped in as acting Herbarium Manager, Golinski and Abdurahimova got to work. Forty-eight new cases were ordered and the Department of Botany purchased hundreds of archival storage trays.

A continually debated issue, the method of storing the Bryophytes is now transitioning from packets glued on sheets to a system where packets are stored upright in archival trays. Each institution has its preference, but at the Smithsonian the change to storing packets in trays will reduce the physical space the collection takes up by half. As well it will eliminate the need to replace very old sheets that are non-archival and highly acidic (which over time leaches out and contributes to the decay of collections). This approach will also reduce the costs in the long-term for replacing packets and will make the collections much more easily accessible. Instead of having to pull an entire sheet with multiple specimens glued to it, scientists and collections staff can pull only what they

need and easily open the packets without disturbing material in other packets attached to a sheet. Sending loans becomes much more efficient and reduces the possibility of losing multiple packets if a loan goes astray (also making the other specimens that might have been attached readily available for examination by other scientists).

With the new system and up-to-date curation in place, duplicates can be sent on exchange through dormant and newly established programs and the Smithsonian has ample space to continue welcoming excellent material with this modern and up-to-date facility, hopefully inciting greater exchange among institutions. Though Robinson still has a preference for the sheet system, he pointed out that he never learned to properly mix paste and water as a child, and to this day remains an ineffective gluer (perhaps foreshadowing the easy removal of these less-than-glued packets to one day be housed in trays).

Since before Robinson was hired, the collection was arranged according to the Engler & Prantl system of classification outlined in *Die Natürlichen Pflanzenfamilien*, which was published near the turn of the 20th century. Though subsequent editions have been revised, the arrangement of the bryophytes in the US collection continued to follow the system set forth in the first edition because the newer

treatments did not include hepatics, an opportunity that still remains open for any enterprising hepaticologist with a nostalgia for Engler & Prantl to take on. While rehousing the specimens, it is only fitting that the collection be curated according to a modern phylogenetic system of arrangement. Families are being arranged phylogenetically, based on broad consensus among contemporary evolutionary bryologists. Within families, genera and species are being arranged alphabetically. The existing geographical divisions within the species will largely be retained but will be modified slightly to establish consistency with the recently reorganized Pteridophyte collection.

While bryophytes are historically understudied, Golinski and Abdurahimova can attest to the significance of moss and hepatic research. Despite their small size, bryophytes constitute a large part of the Earth's biota and act as sensitive indicators of air quality and climate change, store carbon, keep soil moist, and, as important components of biological crusts, initiate soil formation. Under the microscope their beauty and intricacy is on full display—large and unmissable. A specialist in sphagnum mosses, Golinski was initially awarded a contract to inventory and distribute the extensive backlog of bryophyte specimens that had accumulated atop the fifth floor herbarium cabinets and was subsequently invited by former Department Chair Laurence Dorr to succeed Bob Ireland as a bryological Research Associate in 2017.

Already a contractor at the Smithsonian, Abdurahimova, the second lichenologist in Turkmenistan, came to the Smithsonian on a Fulbright fellowship over 15 years ago and has continued working in the herbarium ever since. Specializing in the small composite organisms, she also has a keen eye for the delicate details of bryophytes. Golinski and Abdurahimova can be found between the fifth and third floors of the Museum's West Wing, cutting packets off sheets, folding packets, gluing labels, examining specimens under the microscope, updating taxonomic names, taking a quick sip of tea, and opening mysteriously dusty boxes. They are assisted by volunteers Julia Beros, who has helped with multiple aspects of the work on Mondays and Fridays for several



One of a handful of specimens collected by naturalist Edgar Mearns in 1909 for the historic Smithsonian-Roosevelt African expedition, most of which remains unidentified. (photo by Gary Krupnick)

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Bryophytes

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months, and Zelda McDonald, who comes in on Tuesdays and focuses on removing the liverwort packets from the sheets. Most recently, during breaks in her regular duties, long-term Botany contractor Pat Jones has been trimming large pieces of archival quality paper that the specimens were previously attached to into divider cards to be printed with species names and

repurposed as dividers to separate groups of specimen packets.

With the ambition to curate and safely rehouse the collections, reignite institutional exchange relationships, and invite curiosity and research activity in the Bryophyte collection, there is hope that the legacy of productive research will continue and that the Collections Care and Preser-

vation Fund may continue to support overlooked collections in the US National Herbarium. There is also the intention that this project will lay the groundwork for continuing enhancement of the Bryophyte collection, by creating digital specimen records, making the collections more globally accessible and enduring.

After school students participate in Pterrific Pteridophyte Ptuesdays

This past fall members of the Department of Botany teamed up with Education & Outreach to hold an after-school class for 18 local teenagers called “Pterrific Pteridophyte Ptuesdays.” **Liz Zimmer, Peter Schafran, W. Carl Taylor, Gabe Johnson, Shruti Dube, Eric Schuettzel,** Steven Canty, **Erika Gardner,** and Juan Pablo Hurtado Padilla introduced students to collections-based research of plants over four consecutive Tuesdays in October and November. On the first night, the students received a tour of the US National Herbarium led by Gardner, which featured the fern collection and mounting rooms. Afterwards the students constructed growth chambers with aluminum foil and milk crates in which to incubate petri dishes of *Ceratopteris* spores that they learned to sow using aseptic technique.

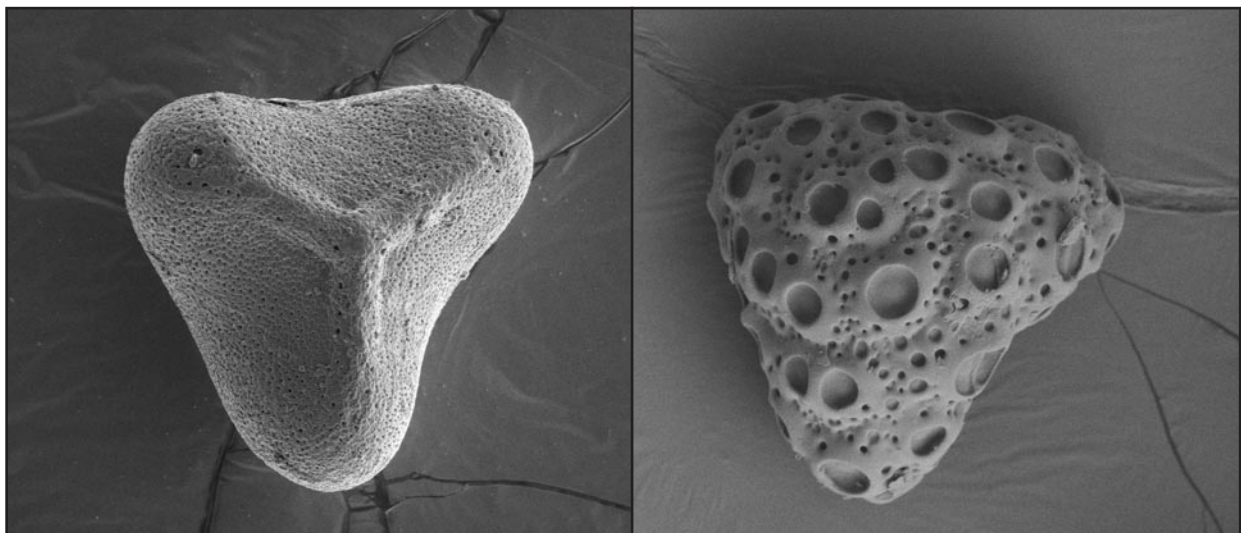
The following week, the students observed the germination of the gametophyte

from the spore and then attended a special lecture by Schuettzel on his career in pteridology and current research on the evolution of fern epiphytism.

The students spent the third class learning to identify potted fern specimens with a dichotomous key and then pressed frond specimens collected from the Smithsonian Gardens’ Urban Bird Habitat (west side of the museum). Students learned how to identify key morphological features of leaf dissection and indusia and sori. In addition to macromorphology, the students learned to describe a diversity of fern spores under light and electron microscopes. Padilla assisted the students in creating stunning 3D SEM images of spores that they used in a spore-based plant identification matching game.

Water was added to their sexually mature gametophyte cultures to precipitate the release of free-swimming sperm under

the microscope. Students identified male and female gametangia and the spiral, multi-flagellated swimming patterns of sperm. With this knowledge of gametophyte fertilization, student groups then created an experiment where a serial dilutions of a pollutant, such as bleach, 409 degreaser, Ajax, or motor oil, were applied to a set of gametophyte cultures. The viability and fertilization rates of the cultures treated with various concentrations of pollution were then compared to that of control plates in which water was added to initiate fertilization. Apparently 409 spray does not kill *C. richardii* gametophytes, but has a relatively long-lasting inhibitory effect on fertilization. Overall, the students were very *indusiastic* to learn about ferns and were *sori* to say good-bye on the last night.



Spores of *Cyathea divergens* and *Cyathea myosuroides*. Students learned to differentiate species based on spore ornamentation characters, such as differentiating perforate versus foveolate depressions. (photo by Juan Pablo Hurtado Padilla)

Brazil-endemic plant genus *Mcvaughia* highlights diversity in a unique biome

-Adapted from Pensoft Publishers

A new species of the Brazil-endemic small genus *Mcvaughia* is described as part of an extended revision of this unique group. The study was recently published in the open access journal *PhytoKeys*.

Mcvaughia is a genus of the plant family Malpighiaceae comprising just three known species, all of which endemic to the unique Seasonally Dry Tropical Forests biome found in the Atlantic Forest and Caatinga domains in northeastern Brazil.

In fact, Seasonally Dry Tropical Forests have only been recognized as a worldwide biome recently and taxonomic studies focusing on its endemic plant species are imperative for conservation management.

In their newly published monograph, the team of scientists from Universidade Federal de Minas Gerais, Universidade Federal de Viçosa, Universidade Federal do Amazonas, Universidad Nacional Autónoma de México, and the Smithsonian's National Museum of Natural History answer the need for a deeper understanding on this unique biome, starting with genus *Mcvaughia* and hoping to continue with other endemic plant groups in the future.

"We are truly fascinated by the members of this new and exciting biome and when during a visit in Brazilian her-



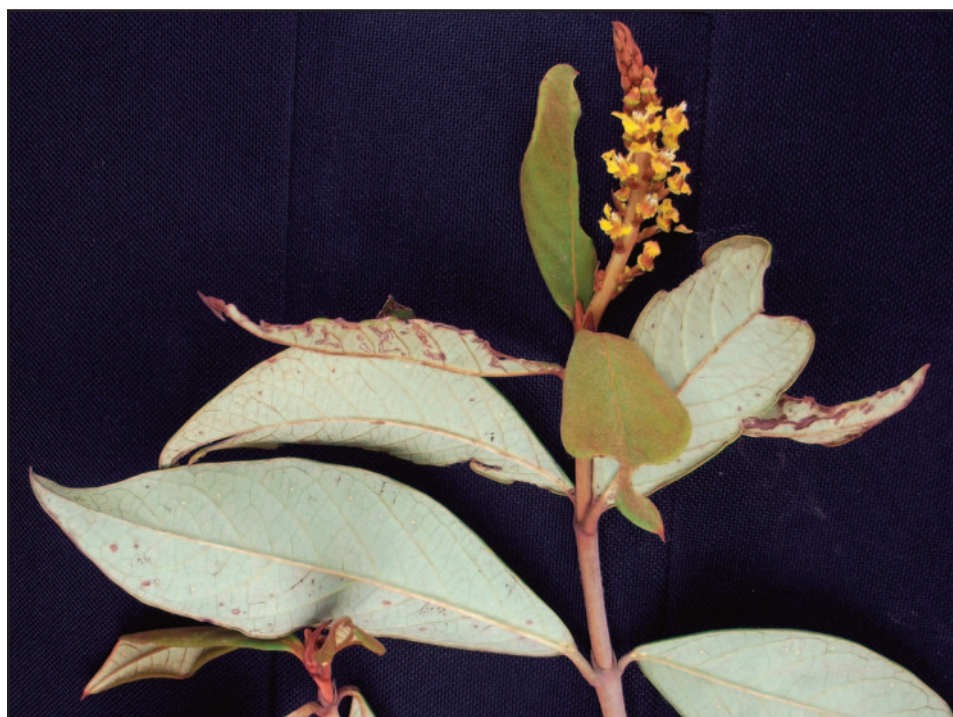
Mcvaughia bahiana is just one of only three species recognized in the genus found in Brazil. (photo by I.R. Guesdon)

baria, we found a third species of *Mcvaughia* endemic to seasonally dry forests from the state of Piauí, Brazil, we couldn't miss the chance to improve knowledge on this

unique genus and the biome where it is only found," explains lead author, Rafael F. Almeida from the Universidade Federal de Minas Gerais, Brazil.

The name of the newly described species *Mcvaughia piauiensis* pays tribute to Rogers McVaugh, an American botanist, expert in the Mexican flora.

"The results presented in this study are the second step towards a complete taxonomic revision of the Mcvaughoid clade using several additional methods in biosystematics. The macro and micromorphological data presented here are promising for future taxonomic and phylogenetic studies focusing on understanding the morphological evolution in the Mcvaughoid clade, and in Malpighiaceae, as well," conclude the authors.



Mcvaughia sergipana is another representative of the small endemic genus from the seasonally dry tropical forests of Brazil. (photo by R.F. Almeida)



STAFF ACTIVITIES

On 28 March, **Manuela Dal Forno** participated in two video broadcasts of “Exploring the Amazing World of Lichens” on Smithsonian Science How, a free, interactive, live video webcast that takes questions from students while introducing them to science concepts and practices through the lens of Smithsonian research and experts. In the video, archived at <https://naturalhistory.si.edu/education/distance-learning/exploring-amazing-world-lichens-manuela-dal-forno>, Dal Forno takes students on an exploration of the world of lichens, helping them to realize that lichens are living all around us—from forests to city streets. She explains what lichens are and how the lichen symbiosis works. Classes across the country had the opportunity to see Manuela’s student interns in action extracting DNA from lichens in one of the Smithsonian’s labs. Throughout the live broadcast, Dal Forno took questions from students via text chat. In addition to the archived video, companion worksheets and answers with the theme, “Exploring Lichens,” are available.

On 16 March, more than 130 local teens participated in the third annual Teen Earth Optimism event in Q?rius, the science education center at the National Museum of Natural History in Washington, DC. A collaboration with the Smithsonian Conservation Commons, the event focused on the ethics, nutrition, culture, and innovation of food. Experts from multiple Smithsonian units, teen leaders, and local non-profits participated. Teens engaged with scientists at several conservation stations that ranged in topics from composting and the history of food to bird-friendly coffee and the sustainable management of fisheries. **Gary Krupnick** spoke with teens about the role of pollination in food security and the steps individuals can take to support the health of pollinator populations. With a couple minor exceptions, all of the waste from the program was recycled or composted, resulting in a near-zero waste event!

On 15 March, **Alice Tangerini** participated in the Open Studio Botanical Art Event as part of the Orchid Show in the Kogod Courtyard at the National Museum of American Art (NMAA). Tangerini pro-



Emmanuel Kyei-Baffour and Maggy Benson (Education & Outreach) interview lichenologist Manuela Dal Forno during a broadcast of “Exploring the Amazing World of Lichens” on Smithsonian Science How. (photo by Jennifer Renteria, NMNH)



Gary Krupnick engages with teens in a conversation about the importance of pollination and food security. (photo by Christian Lilakos, NMNH)

vided her drawings of orchid flowers, in pen and ink and then digitally colored, which previously were signage for the NMNH Orchid Show in 2007. Organizers made hundreds of copies of the drawings as handouts and provided art materials for the visitors. Over 200 visitors came to the Open Studio event between 1:00 and 5:00 pm, often filling all 16 tables arranged in the Courtyard. Smithsonian Gardens had staff on hand to provide information on the orchids. Tangerini and Jill Galloway,

NMAA’s local art instructor, provided advice and instruction on drawing or coloring the orchids in pencil and watercolor.

On 8 March, scientists, research associates, students, and contractors from the Department of Botany joined other women from the National Museum of Natural History to participate in a group photo honoring International Women’s Day. The photo gives tribute to all the past, present, and future generations of women in STEM.



Visitors participate in drawing orchids at the Open Studio Botanical Art Event at the National Museum of American Art. (photo by Alice Tangerini)



National Museum of Natural History participants honor International Women's Day. (photo by Lucia R.M. Martino and James Di Loreto, Smithsonian Institution)

TRAVEL

David Ballantine traveled to La Parguera, Puerto Rico (3/12 – 3/17) to attend the EPA sponsored coral reef Biological Criteria Gradient Workshop and to examine specimens at the Herbario Marino Puertorriqueño.

Laurence Dorr traveled to Philadelphia, Pennsylvania (2/28 – 3/1) to visit the herbarium of the Academy of Natural Sciences at Drexel University to search for type materials.

Laurence Skog traveled to Gainesville and Sarasota, Florida (1/21 – 1/25) to examine specimens of Gesneriaceae at University of Florida and Marie Selby Botanical Gardens.

Warren Wagner traveled to Kauai, Hawaii (3/20 – 4/7) to attend the board meeting of the National Tropical Botanical Garden, to give a presentation, and to conduct research on *Schiedea* (Caryophyllaceae) and the Flora of the Marquesas.

VISITORS

Jie Yu, Southwest University, China; Plant DNA barcoding (1/22/18 - 1/4/19).

Patricia Chan, Cornell University; *Isoetes* internship (11/19/18 - 2/28/19).

Jennifer Ackerfield, Colorado State University; Asteraceae (1/25 - 3/29).

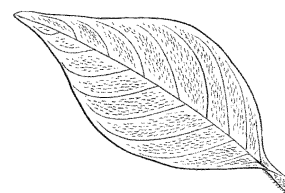
Joe Miller, National Science Foundation, and **Vanessa Terra**, Federal University of Uberlândia, Brazil; Legumes (2/27 - 3/1).

Samuel Skibicki, University of West Virginia; Compositae (2/28 - 3/1).

Amanda Grusz, University of Minnesota Duluth, and **Michael Windham**, Duke University; Fern cytogenetics workshop (3/11 - 3/15).

Chris Martine, Bucknell University; Botany seminar (3/12 - 3/13).

Alina Freire-Fierro, Universidad Técnica de Cotopaxi, Ecuador; Compositae (3/20).

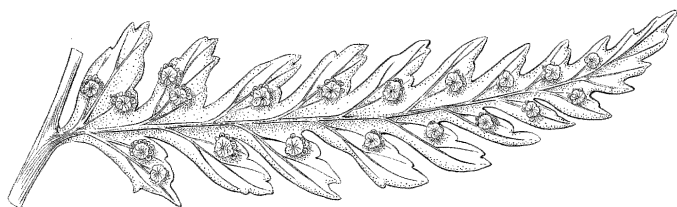




NEW FACES

Joel Nitta joined the Department of Botany as a Peter Buck Postdoctoral Fellow in January 2019. Nitta is working with **Eric Schuettelpelz** and **Warren Wagner** to investigate the biogeography of pteridophytes (ferns and lycophytes) in the Pacific, with a focus on Polynesia. This project expands on Nitta's Ph.D. research at Harvard University where he examined community assembly of ferns on the islands of Tahiti and Moorea, French Polynesia. Nitta recently completed his first postdoctoral fellowship

as a Japan Society for the Promotion of Science Fellow with Atsushi Ebihara at the National Museum of Nature and Science in Tsukuba, Japan, where he developed next-generation DNA sequencing methods to better understand the evolution of fern species complexes. Nitta is interested in pteridophyte systematics, ecology, and evolution, and is enthusiastic about the practice of reproducible data analysis with open-source code.



PUBLICATIONS

Almeida, R.F., I.R. Guesdon, **M.R. Pace** and R.M.S. Meira. 2019. Taxonomic revision of *Mcvaughia* W.R. Anderson (Malpighiaceae): notes on vegetative and reproductive anatomy and the description of a new species. *PhytoKeys* 117: 45-72. <http://dx.doi.org/10.3897/phytokeys.117.32207>

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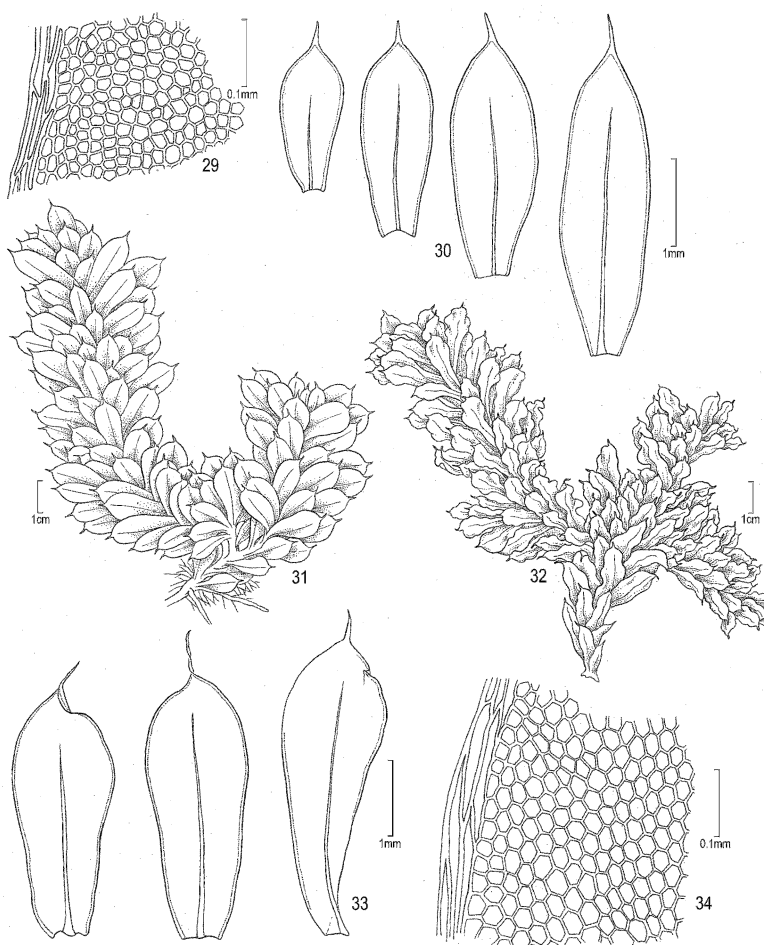
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ART BY ALICE TANGERINI

***Distichophyllum cuspidatum* (Dozy & Molk.) Dozy & Molk.
and *Leskeodon brevicuspidatus* (E.B. Bartram) B.C. Tan
& H. Rob.**

In a 1990 monograph in *Smithsonian Contributions to Botany* (Number 75), Benito Tan and Harold Robinson reviewed the Philippine taxa of Hookeriaceae. Their treatment looked at 11 genera and 36 species in this family of mosses. Alice Tangerini illustrated 15 species for this publication, including *Distichophyllum cuspidatum*, a widespread species from Malesia and Oceania, and *Leskeodon brevicuspidatus*, from Papua New Guinea and Mindanao, Philippines. Tangerini worked on the moss drawings in the spring of 1988 using material from the bryophyte collection. She also inked some sketches of cell drawings made by Tan.



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