

Stamp of approval A guide to gesneriads on stamps

By Larry Skog and John L. Clark

Stamp-collecting, or philately, is a time-honored hobby that has been indulged in by kings, presidents, and everyday folk since postage stamps first came into use in the 1840s. While stamp collectors or philatelists fill their collections with stamps from many countries or concentrate on a single region, others devote their time collecting special topics such as stamps showing ships, military, cats, or dogs. Some specialize in postage stamps with plants, of which thousands exist from Afghanistan to Zimbabwe, thus a never-ending source of opportunity.

We recently published a 3-part series about gesneriads (Gesneriaceae) on postage stamps in *Gesneriads*, the quarterly journal of The Gesneriad Society (<http://www.gesneriads.org>). The series covers 73 stamps from 50 countries showing 21 genera and 35 species, hybrids, and cultivars. The first part dealt with New World gesneriads [in *Gesneriads* 71(2): 5-28. 2021]; the second part has Asian and Western Pacific gesneriads [*Gesneriads* 71(3): 12-30. 2021]; and the third part featured European and Africa gesneriads [*Gesneriads* 72(1): 4-26. 2022]. The Bot-

any and Horticulture Library <<https://library.si.edu/libraries/botany>> at the National Museum of Natural History carries the journal *Gesneriads*, as do many local, herbaria, and university libraries.

In the articles, each stamp is shown in color, from Skog's collection of plant stamps (or found and purchased on-line from eBay or other sources). Each stamp image is accompa-

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The goal of the project was to identify images of all postage stamps that feature Gesneriaceae and to provide accurately identified photographs of the same species or cultivars from natural or horticultural populations.

Stamps

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nied by a photo of a wild or cultivated plant of the same species or cultivar from Clark's vast photo collection, or photos from other gesneriad growers or field collectors.

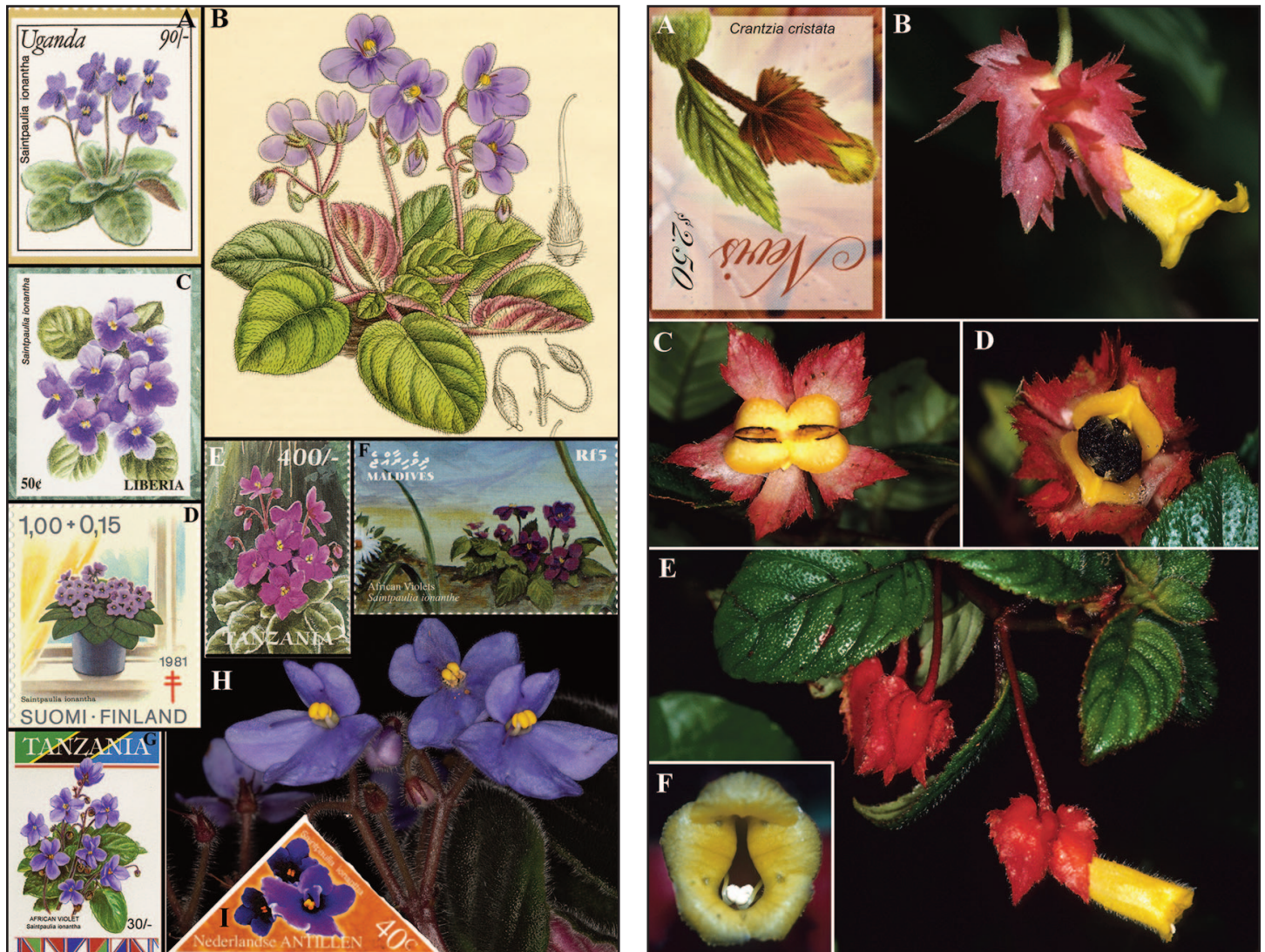
The goal of the project was to identify images of all postage stamps that feature Gesneriaceae by consulting horticultural and taxonomic literature as well as providing accurately identified photographs of the same species or cultivars from natural or horticultural populations. The authors

had much help from gesneriad growers and other specialists, with more than 60 people contributing identifications of the plants on the stamps, providing images of the living plants (many were Clark's own field photos), and information about the natural history of the species.

Seventy-three stamp images may seem like a lot of stamps showing plants from a single family. Other plant families, however, have hundreds, if not thousands of stamps from dozens of countries. Orchidaceae is the most popular family on postage stamps. Rosaceae is likely the second most popular family showing roses or fruits (ap-

ples, pears, strawberries, etc.). The grass family, Poaceae, is represented by a large number of stamp images, particularly showing wheat or corn. The palm family, Arecaceae, is featured on many stamps from tropical and Pacific Island countries, with the coconut palm as the main subject or in the background.

The most popular genus of Gesneriaceae illustrated on postage stamps with numerous cultivars and hybrids is *Streptocarpus*, which is featured on 29 stamps from 22 countries from Burundi to Yugoslavia. The most popular species is *Streptocarpus ionanthus* (formerly known



Streptocarpus (= *Saintpaulia*) *ionanthus* is the most popular gesneriad featured on stamps from around the world. A. Uganda stamp. B. Lithograph from Hooker (1895). C. Liberia stamp. D. Finland stamp. E. Tanzania stamp. F. Maldives stamp. G. Tanzania stamp. H. Cultivated collection of *S. ionanthus* from the Herrenhäuser Botanic Garden (accession number 2016-G-619). I. Netherlands Antilles stamp. (Image H courtesy of Boris O. Schlumpberger)

Crantzia cristata is an epiphytic plant native to the Lesser Antilles and Guyana with red calyces and yellow corollas growing in wet forests. A. Nevis stamp. B. Flower. C. Bivalved fruit. D. Open fruit with mature seeds. E. Branch with pendent flowers. F. Front of flower. (Photographs in Figs. B-F by J.L. Clark)

as *Saintpaulia ionantha*), the African violet, featured on 23 stamps, including a United States stamp issued in 1993 that commemorated the original discovery and publication of the species.

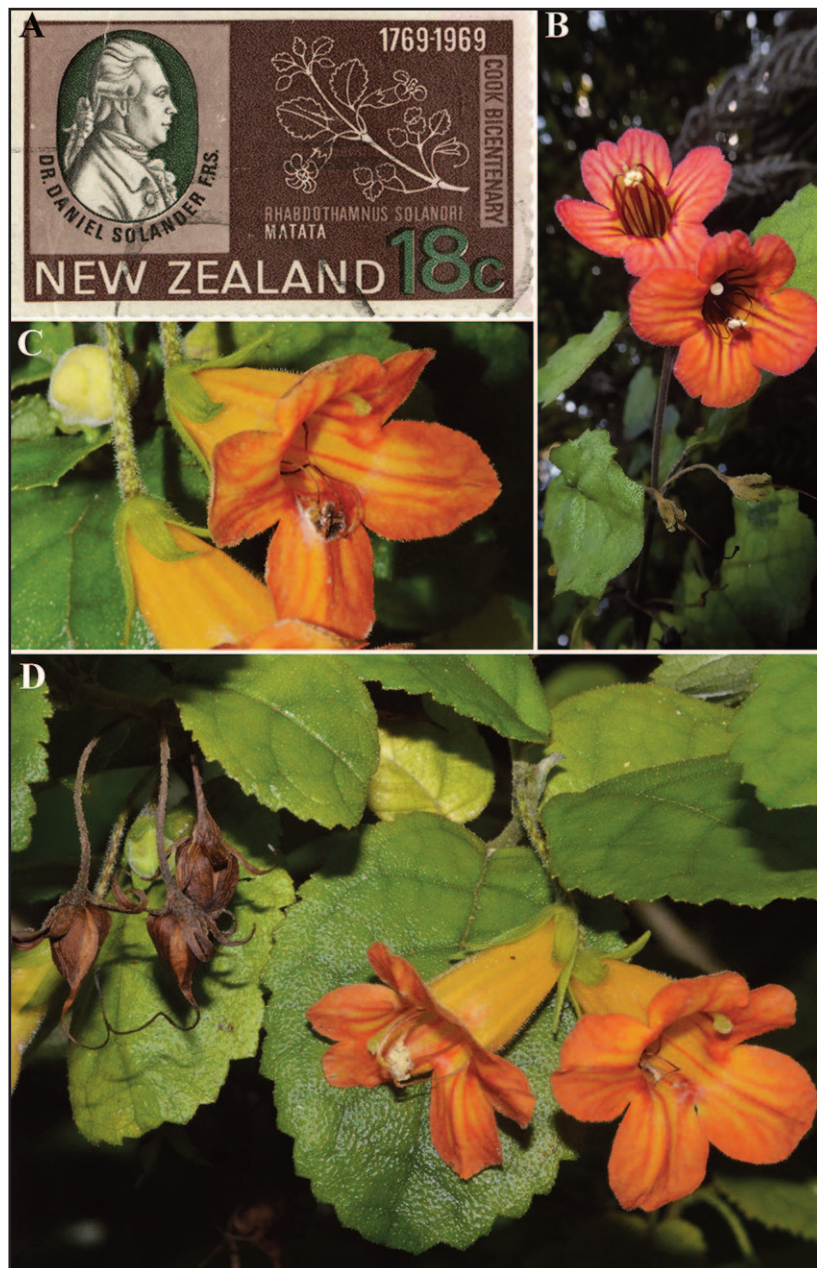
The rarest gesneriad on a postage stamp is *Boea urvillei*. This species is known only from two specimens housed at the Naturalis Biodiversity Center (Leiden, Netherlands) collected on the remote Waigeo Island off the coast of West Papua of Indonesia. A 1955 collection of *B. urvillei* by Pieter van Royen served as the basis for

a drawing by an artist at Leiden, and from the drawing an image was reproduced on the stamp from the former Netherlands New Guinea.

New Zealand's only gesneriad, *Rhabdothamnus solandri*, is featured on a stamp honoring Daniel Carl Solander (1733-1782) who collected the species as the resident botanist on Captain Cook's first voyage to the South Pacific. All of the stamp-imaged plants have stories including *Jancaea heldreichii* growing only on Mt. Olympus in Greece, to *Cyrtandra pla-*

typhylla growing on the Big Island in Hawai'i, and even a bogus stamp from a non-existent country featuring *Sinningia cooperi*.

The project linked several stamp images to lithographs, mainly from the 19th century. While tracking down an image from the Dibang Valley in India for example, it was discovered that a recent publication of a new species (*Henckelia siangensis*) described a previously published species (*H. dibangensis*) – the same species that was incorrectly identified on the postage stamp. Thus there are three names for two species, and the incorrect identification on the postage stamp facilitated the discovery that the same species was independently published. The discovery also allowed us to better understand that *Henckelia mishmiensis* (named after Mishmi or Deng people of Tibet and Arunachal Pradesh) is more common than what is represented in herbaria. There are even recent observations of this poorly documented species in iNaturalist! The principle of priority decides which name is accepted, and in this case the recent name (*H. siangensis*) should be considered a synonym.



Rhabdothamnus solandri is New Zealand's only gesneriad. A. New Zealand stamp showing an image of Daniel Solander and a line drawing of the plant. B-D. (Photographs of the species from the wild in New Zealand. Image B courtesy of Maurice Needham; C & D courtesy of Jan Thomas Johansson)



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Chair of Botany
Eric Schuettelpelz
(schuettelpelze@si.edu)

EDITORIAL STAFF

Editor
Gary Krupnick
(krupnick@si.edu)

Copy Editors
Robin Everly, Bernadette Gibbons, and
Rose Gullledge

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If you would like to be added to the hard-copy mailing list, please contact Dr. Gary Krupnick at: Department of Botany, Smithsonian Institution, PO Box 37012, NMNH MRC-166, Washington, DC 20013-7012, or by E-mail: krupnick@si.edu.

Web site:
<https://naturalhistory.si.edu/research/botany>



Registration now open for the 2022 Smithsonian Botanical Symposium

The Smithsonian's Department of Botany and the United States Botanic Garden will hold the 19th Smithsonian Botanical Symposium, "Life on the Edge: Exceptional Plants in Exceptional Places," on 13 May 2022.

Plants live in seemingly inhospitable environments that exhibit extremes of light, temperature, altitude, drought, and substrate. To survive in the driest deserts, on mountaintops, without soil or with toxic soil, numerous adaptations have evolved to enable specialized plants such as succulents, epiphytes, and alpinists to exploit these environments. The 19th Smithsonian Botanical Symposium will explore current research on plants in extreme environments, examining their natural history, evolution, and value for human survival, in the face of climate change and increasing pollution. Speakers will include scientists specializing in conservation, ecology, systematics, and genetics whose research explores plant survival in extreme parts of the natural world.

In addition, the 19th José Cuatrecasas Medal in Tropical Botany will be awarded at the Symposium. This prestigious award is presented annually to an international scholar who has contributed significantly to advancing the field of tropical botany. The award is named in honor of Dr. José Cuatrecasas, a pioneering botanist who spent many years working in the Depart-

ment of Botany at the Smithsonian and devoted his career to plant exploration in tropical South America.

The Symposium will be a hybrid event serving both in-person and virtual guests. If you wish to attend in-person, the Symposium will be held at the National Museum of Natural History in Washington,

DC. If you wish to attend virtually, a Zoom link will be provided after you register online. We request all attendees, both in-person and virtual, to register at https://smithsonian.zoom.us/webinar/register/WN_I7QFKW9BSZ-ss6uyWW9Erg.

The event is free; there is no registration fee to attend the Symposium.

Tentative schedule

Friday, May 13, 2022

(all times are Eastern Daylight Time)

- 1:00 pm – Welcome and presentation of the José Cuatrecasas Medal
- 1:15 pm – Jenna Ekwealor (Smithsonian Institution), "The secret lives of desert moss"
- 1:45 pm – Fabian Michelangeli (New York Botanical Garden), "Endemism and adaptations in the flora of the lost world"
- 2:15 pm – Break
- 2:45 pm – Tanisha Williams (Bucknell University), "Protecting the Fynbos: climate change insights from South Africa"
- 3:15 pm – Ben Nyberg (National Tropical Botanical Garden), "A conservation airlift: applications of drone technology in plant conservation"
- 3:45 pm – Break
- 4:15 pm – Jessica Allen (Eastern Washington University), "Urban lichens: symbioses in the built environment"
- 4:45 pm – Panel Discussion
- 5:15 pm – Wrap-up

Smithsonian study finds more ‘losers’ than ‘winners’ among plants in the age of humans

A new analysis spanning more than 86,000 plant species from **John Kress**, botany curator emeritus at the Smithsonian's National Museum of Natural History, and **Gary Krupnick**, head of the museum's plant conservation unit, finds that on this human-dominated planet, many more species of plants are poised to “lose” rather than “win.” The study was published in the journal *Plants, People, Planet* (<https://doi.org/10.1002/ppp3.10252>).

From changing Earth's climate to destroying, degrading and altering ecosystems on a massive scale, human choices now largely dictate the environmental conditions across much of the globe and, as a result, which species of plants and animals can survive and persist and which will go extinct. Species lucky enough to be directly or indirectly aided by human activities are likely to survive and can be thought of as “winners,” while those that are pushed to ecological irrelevance or extinction by those same activities are the ultimate “losers” in evolutionary terms.

Kress encountered this concept of evolutionary winners and losers in the age of humans (known to some researchers as the Anthropocene), in the writings of John McNeill and wanted to see if it might be possible to tally the plant species that were winning and losing now and in the future.

“I actually started this project from a place of optimism,” Kress said. “I had just planted all these trees around my house in Vermont and thought to myself that maybe there are actually more winners than losers, and we are just focused on everything that's disappearing.”

In the summer of 2019, Kress brought Krupnick into the fold to help compile and analyze the mountains of data required to put every plant species for which there was enough information into the categories of winners and losers. The researchers split the winners and losers into species that are and are not useful to humans.

In addition to these four categories, Kress and Krupnick created four others: Species that appeared likely to win or lose in the future were deemed tentative winners or potential losers, and species that do not seem to be winning or losing at present were considered currently neutral. A fourth and final category included 571



Losers that are useful to humans tend to be overexploited wild species that may be medicinal, ornamental or used for timber. One such species is Ekman's magnolia tree (*Magnolia ekmanii*), a critically endangered tree only found in Haiti that was most likely harvested for its wood to produce charcoal and building materials. Credit: Copyright Martin Reith, some rights reserved (CC BY-NC)

species that have already gone extinct.

To place plants in these categories, Kress and Krupnick combed through databases that listed endangered plant species, economically important species such as crops, invasive and weedy plants, and endangered plants that are involved in legal and illegal global trade.

In total, the researchers were able to place 86,592 species of vascular plants—a large group of plants that have vascular tissue which transport water, nutrients and other substances—into the eight categories that describe their prospects for survival in the Anthropocene. That may sound like an inconceivably large number of species, but it is actually just under 30% of the nearly 300,000 known species of vascular plants. There simply was not enough data to categorize the remaining 70% of global plant diversity, which reflects how much is left to learn about Earth's botanical riches, Kress said.

The analysis revealed that losers currently outnumber winners, and that losers are likely to continue to outpace winners

in the future if human impact on the planet maintains its current trajectory. Kress and Krupnick categorized 20,293 species of plants as losers, with the vast majority of those losing species being identified as not useful to humans. By contrast, the researchers found just 6,913 species of winners, with all but 164 of those species having some human use.

In the future, barring significant changes in how people conduct themselves on Earth, losers are projected to continue to outnumber winners, with 26,002 species in the potential losers category compared to 18,664 species in the tentative winners category.

To look for evolutionary patterns within the clear winners and losers identified by the study, the researchers also mapped the locations of these lucky and unlucky species on the tree of life.

“The question was whether there were some lineages of plants that were more packed with winners or were full of losers we should be concerned about,” Kress said.

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Winners & Losers

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As it turned out, winners and losers were for the most part evenly distributed across plant orders. The exceptions came primarily from small lineages, which were more prone than lineages with many species to leaning heavily in favor of winners or losers, Krupnick said. Three of the lineages most at risk of extinction include cycads, the cypress family (which includes redwoods and junipers), and an ancient family of conifers called the araucariales which are today mostly found in New Caledonia.

Branches of the plant evolutionary tree with few species and more losers than winners such as these have an elevated risk of being lost altogether, taking with them everything there is yet to learn about their biology and their lineage's genetic uniqueness.

"Now and in the future, plants have to adapt to the environment humans have created or they will go extinct," Krupnick said. "Our results suggest that this means the plant communities of the future will be more homogenized than those of today."

This increased homogeneity is likely to have serious consequences for ecosystems around the world as well as for humanity. Losing plant diversity can drive a loss of animal diversity, Kress said, and make ecosystems less resilient in the face of hardship or change.

"The list of winners shows that we've selected certain species that are useful to us, but as that pool of plants we have to select from decreases in the future, humanity will have many fewer options when we want to reforest the planet, find new medicines or foods, or develop new products," Kress said.

Kress said he hopes that these lists will afford other researchers opportunities to look more in depth about why certain species of lineages are winning or losing in the age of humans and to identify the plants that are most in need of conservation.

"It still looks green outside my window, and that can create the illusion that plants are doing well," Kress said. "But this study suggests we're on course for a big loss of plant diversity, and we better wake up."

Funding and support for this research were provided by the Smithsonian.

THE CORNERED CURATOR

Living in harmony with nature: Winners, losers, and the Convention on Biological Diversity

By W. John Kress

Co-Chair, Earth BioGenome Project; Visiting Scholar, Dartmouth College and the Arnold Arboretum of Harvard University; Distinguished Scientist and Curator Emeritus, National Museum of Natural History

A recently published scientific paper documents the imminent decline of thousands of species of plants as a result of the degradation and deterioration of natural environments caused by human greed and recklessness (*Plants People Planet*; <http://doi.org/10.1002/ppp3.10252>). As coauthors of that paper, **Gary Krupnick** and I worked to compile and analyze mountains of data on every species of plant for which we could find information about its current status on the planet.

We categorized each species as a "winner" or "loser" according to how it has

responded to the "Lords of the Biosphere," as our own species has been called by Professor John McNeill of Georgetown University. Plants that are useful to people, such as crops and plantation timber trees, or take advantage of environments altered by humans, such as invasive species, stand a good chance of surviving the current perils facing the planet, which include unrelentless habitat destruction, out-of-control climate change, rampant pollution, and escalating diseases. Such species will be the winners that survive the hazards of the Anthropocene to flourish once again in a future, perhaps hundreds or thousands of years from now, when humans will have less impact. Species that are not useful to people and inhabit threatened ecosystems or are exploited for their useful properties, such as wild medicinal plants, will be the



The category of losers that are not useful to humans features mostly plants that cannot survive in human-dominated environments or have suffered under direct or indirect pressures from human activities. An example of a loser not useful to humans is *Araucaria muelleri*, a New Caledonian endemic conifer threatened by habitat loss, forest fires and nickel-mining activities. Credit: Copyright Joey Santore, some rights reserved (CC-BY-NC)

losers. These species will succumb to human-dominated habitats, will decline in number, and may eventually go extinct.

Although our conclusions were not what we were hoping for, we were not surprised by the results: among the tens of thousands of plant species we analyzed, the losers by far outnumbered the winners. No, it was not a good outcome. In fact, the result is extremely discouraging, and another indicator that humans, the world's biodiversity, and the planet are on a dangerous and tragic trajectory if we do not change fast.

It is no coincidence that a week after this publication went to press (although certainly not because of this paper) thousands of international delegates and concerned observers met in Geneva, Switzerland, to prepare for the 15th meeting of the Conference of the Parties of the United Nations Convention on Biological Diversity (CBD), which will convene in Kunming, China, later this year. The long-anticipated meeting in Geneva, which is really three separate meetings taking place at the same time: SBSTTA-24 (called the Twenty-fourth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice), SBI-03 (Third meeting of the Subsidiary Body on Implementation), and WG2020-03 (Third meeting of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework), took place over a two-week period, from March 14 -29, to facilitate long-term discussions on how to prevent further loss of biodiversity while at the same time making the benefits of Nature available for human well-being. I participated in the Geneva meetings over those 16 long days as a virtual official Observer representing the *Earth BioGenome Project*.

The new framework discussed and debated in Geneva, with the vision of "Living in Harmony with Nature by 2050," was prepared for ratification in Kunming by the 175+ participating signatory nations of the Convention (not including the United States). The goals are to enhance the integrity of ecosystems, reduce the rate of extinction, safeguard the genetic diversity of species worldwide, value Nature's contribution to people, make sure that the benefits of biodiversity are shared equitably, and secure resources to accomplish its long list of specific targets. Reading through these targets, which include everything



Winners useful to humans include species that are widespread and provide wood, medicine, food and ornamental value. *Ginkgo biloba*, for example, has been grown by humans for hundreds of years and is a popular ornamental tree that has also been used for food, medicine and as a dietary supplement. Credit: Smithsonian Institution by permission from G.A. Cooper

from increasing protected areas, restoring degraded ecosystems, improving ex-situ conservation, reducing the introduction of new invasive species, reducing pollution, and minimizing climate change, to enhancing natural areas in urban environments and expediting the use of genetic resources to benefit all (especially indigenous peoples and local communities), one begins to feel a bit hopeful. I am struck by the fact that the "loser" species of plants Gary and I had just documented would have to be re-evaluated and perhaps re-assigned to the "winners" column if all of the objectives of the new CBD biodiversity framework are actually achieved.

Unfortunately, the last such attempt by the CBD to lay-out an attainable framework to protect and use the Earth's biodiversity, called the "Aichi Biodiversity Targets," ended up after a decade of effort with not a single one of the 20 targets accomplished. Formulated and adopted by the Tenth Conference of the Parties in Nagoya, Aichi Prefecture, Japan, in 2010, the "Strategic Plan for Biodiversity 2011-2020" outlined more or less the same goals and targets that were debated and revised in Geneva. To its credit the Strategic Plan clearly raised global awareness of the immense problems currently faced in protecting Nature. However, the actions

required to relieve the pressures and reduce the threats present when the Plan was enacted have not materialized.

Today, more habitats are being converted to degraded ecosystems, more species of plants and animals are threatened with extinction, and more carbon dioxide is being pumped into the air than in 2010. In addition to the exacerbation of all the same environmental issues present at that time, the societal challenges of economic inequality, racism, social injustice, and increased political strife and warfare have increased by magnitudes. The UN's efforts through the CBD, via the hard work of the Secretariat and all the delegates and observers who toiled away in Geneva could not come at a more critical time. They must be commended and appreciated now more than ever. Their battle is a never-ending one, but they cannot give up. And they will not even though the odds against them are formidable.

We are ready to move as many of those plant species that we analyzed as possible from the "losers" column to the "winners" box. However, I do not see that happening unless we all make some major changes to our lifestyles, our governance, and our economies. It is up to you as individuals and as citizens of the planet to help us succeed.

Explosive fossil fruit found buried beneath ancient Indian lava flows

-Adapted from Jerald Pinson
The Florida Museum of Natural History

Just before the closing scenes of the Cretaceous Period, India was a rogue sub-continent on a collision course with Asia. Before the two landmasses merged, however, India rafted over a “hot spot” within the Earth’s crust, triggering one of the largest volcanic eruptions in Earth’s history, which likely contributed to the extinction of the dinosaurs.

In a recent study published in the *International Journal of Plant Sciences* (183: 128-138; 2022 <http://doi.org/10.1086/717691>) scientists excavating the fossilized remains of plant material wedged between layers of volcanic rock describe a new plant species based on the presence of distinctive fruit capsules that likely exploded to disperse their seeds. The fossils may be the oldest fruit discovered to date of the spurge family (Euphorbiaceae), a group of plants with more than 7,000 species, with well-known representatives that include poinsettia, castor oil plant, rubber trees, and crotons.

The fossilized fruits were discovered near the village of Mohgaon Kalan in central India, where the remains of the once-widespread volcanic rock lie just beneath the surface in a complex mosaic.

“You can walk around these hills and find chunks of chert that have just weathered up through the topsoil,” said senior author Steven Manchester, curator of paleobotany at the Florida Museum of Natural History. “Some of the best collecting is where farmers have plowed the fields and moved the chunks to the side. For a paleobotanist, it’s like finding little Christmas presents all along the edge of the fields.”

Although there is some uncertainty in the timing, the volcanic eruptions are thought to have lasted for up to 1 million years, occurring in prolonged pulses that blanketed the surrounding landscape in thick lava layers up to 1 mile deep. Today, the basalt rocks leftover from the eruptions, known as the Deccan Traps, cover an area larger than the state of California.

The most violent of the volcanic events, which occurred at the tail end of the Cretaceous, may have been triggered by the asteroid impact half a world away.

“The impact in the Yucatan may have caused seismic perturbations that actually



The fruit of *Euphorbiotheca deccanensis* is potentially the oldest ever discovered of the spurge family (Euphorbiaceae). Based on the preserved fibers within the fossilized fruit, researchers think it likely exploded to disperse its seeds. (photo by Kristen Grace, Florida Museum of Natural History)

disturbed the regime on the other side of the planet, causing lava to erupt,” Manchester said.

Sandwiched between the basalt, paleontologists have found shales, chert, limestone, and clays stacked in a giant layer cake of alternating bands, most of which are rich in the fossilized remains of plants and animals. These fossils provide a glimpse into what seem to have been relatively calm periods of stability between massive lava flows.

The newly described species were likely shrubs or small trees that grew near hot springs created by the interaction of groundwater with naturally heated rock beneath the surface, similar to present-day environments in Yellowstone National Park. At the time of their preservation, India was inching its way through the Earth’s equatorial zone, creating warm, humid conditions that supported a number of tropical species, including bananas, aquatic ferns, mallows, and relatives of modern crepe myrtles.

Petrified wood is a common find in the Deccan traps, but most of them have small diameters, suggesting a lack of large trees whose conspicuous absence has stumped scientists trying to stitch together the ecological history of the region.

“India was positioned at a low latitude, so we’d expect to find big forest giants. But that’s not what we’re seeing,” Manchester said.

It’s unclear why the trees were unable to obtain greater stature, but Manchester suspects the underlying basalt may have restricted the growth of roots. Alternatively, he said, the plants may have been part of

young forests that grew in volcanically active regions, which would have wiped out the surrounding vegetation before it had a chance to mature. “You’re most likely to get fossils preserved when there’s been recent eruptions, which creates a lot of volcanic ash that can bury and preserve plants,” he said.

Fruits from the new species were found pristinely preserved in a matrix of chert by co-author Dashrath Kapgate (J.M. Patel College, India). But with only the fruits to go on, determining which plants they belonged to required a significant amount of investigative research.

“It didn’t really fit well into any known plant group,” said lead author Rachel Reback, who studied the fossils while working as an undergraduate researcher at the Florida Museum. “We ended up having to take a large number of CT scans not only of the fossils we had but of the fruit of living species as well so that we could directly compare them.”

The researchers ultimately determined the fossils belonged to the spurge family by studying similar fruit specimens provided by the Smithsonian Institution and housed at the U.S. National Herbarium. **Ken Wurdack**, curator of botany at Smithsonian’s National Museum of Natural History, served as co-author of the study as well.

One of the fossils was so unlike anything they’d seen, they determined it represented an entirely new species belonging to the fossil genus *Euphorbiotheca*.

The orientation of fibers inside the fruit indicated they were likely explosive, a common means of seed dispersal in other euphorbs, including cassava, rubber trees,

crown of thorns, and castor oil plant. Once the fruit in these species has ripened, they begin to dry out, losing as much as 64% of their original weight, which builds up tension in the rigid outer layers. Once enough water has evaporated, “You hear this loud pop, and the seeds and pieces of the fruit go flying everywhere,” Manchester said, describing the process in rubber trees. “We think this is the case for these two fossil species as well, because we see the same anatomy, where the fibers in the inner and outer layers of the fruit wall are oriented in opposing directions, which helps build torque.”

Fossils like these offer paleontologists

tantalizing clues regarding the origin and movement of species. About 140 million years ago, a conjoined India and Madagascar began drifting away from the supercontinent Gondwana in the Southern Hemisphere, carrying with them plants and animals that evolved in isolation throughout the Cretaceous.

By the time India finally slammed into Eurasia, 10 million years after the extinction of the dinosaurs, it had given rise to an incredible diversity of life found nowhere else. It’s likely the first grapes evolved in India, as did the ancestors of whales. As the Himalayas took shape above the sutured landmasses, new groups

of insect-eating pitcher plants, flightless birds, lizards, freshwater crabs, scorpions and praying mantises all made their way out of India and into new environments in Europe and Asia.

Manchester hopes these fossils and others like them coming out of the Deccan Traps will help illuminate the distribution of species at a critical time in Earth’s history. “What were the environments in India like at a time when it had not yet connected to Eurasia and how do they compare with other regions at that time?” he said. “It’s like filling in the pieces of a puzzle.”

Ancient hybridization and genome doubling explain the origin of the apple tribe

In the 1930s, biologists studying chromosomes in the rose family (Rosaceae) noticed that species in the apple tribe (Maleae) had approximately twice as many chromosomes (base chromosome number = 17) as every other species in the rose family (base chromosome number = 7, 8, or 9). Over the ensuing decades, researchers proposed hypotheses of hybridization and/or genome doubling to explain the evolutionary origin of the apple tribe and the unusually high chromosome counts in the apple tribe.

There were two competing hypotheses explaining the evolutionary origin of the apple tribe, but it was difficult to test them rigorously with the data available at the time. For many years, botanists tested these hypotheses using morphological characters, chromosome count data, and more recently, single-locus genetic data. Until a few years ago, researchers did not have access to genome-scale genetic data to test hypotheses of ancient hybridization and/or genome doubling.

Smithsonian scientists **Richie Hodel**, **Liz Zimmer**, **Bin-Bin Liu**, and **Jun Wen** synthesized recently published phylogenomic data from the nuclear and chloroplast genomes of multiple species in the rose family, and applied novel phylogenetic network and multiply-labeled tree analyses to resolve the origin of the apple tribe. They found that an ancient hybridization event occurred between ancestors of the Rosaceae tribes Sorbarieae and Spiraeae, likely between approximately 65-50 million years ago. Phylogenetic network anal-

yses indicated this hybridization event gave rise to the clade Gillenieae + Maleae. The tribe Gillenieae is a small clade with follicular fruit sister to the larger pome-bearing apple tribe. In contrast to the Maleae, the Gillenieae do not have elevated chromosome counts, indicating that this hybridization event promoted the diversification of the clade Gillenieae + Maleae, but does not explain the high chromosome number in Maleae.

Another key result was that subsequent allopolyploidy (genome doubling involv-

ing two distinct species) between ancestors of the apple tribe likely occurred between approximately 50-35 million years ago. Multiply-labeled tree analyses indicated this event probably followed the divergence of the Gillenieae and Maleae lineages. This genome doubling event explains the elevated chromosome numbers observed in the Maleae by researchers over the past century. The research is published in *Frontiers in Plant Science* (<https://doi.org/10.3389/fpls.2021.820997>).



An ancient hybridization event gave rise to the apple tribe (Maleae) in the rose family, Rosaceae. Maleae taxa include sweet crabapple (*Malus coronaria*) on the left and Callery pear (*Pyrus calleryana*) on the right. (photos by Richie Hodel and Jun Wen)

Women support staff of the US National Herbarium 2022

Historically women have had a heavy presence in museum work most notably in illustration, research assistance, and collection management. More recently collections work has expanded to include digitization, outreach, administration, and library and information resourcing, as well as fulfilling everyday department tasks. Today, women comprise 67% of the support staff in the Department of Botany, while holding only 25% of the curatorial positions. During National Women's History month, we highlight the women support staff of the US National Herbarium.

MaryAnn Apicelli - Administrative Support

MaryAnn has worked in the Department of Botany as an Administration Specialist since January 2001. Prior to this, 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. For a short time she worked for a private practitioner as a Physician Liaison, an Emergency Room Physician Recruiter, and as a Practice Manager. Considering returning to the federal government, a friend and patient suggested the Smithsonian because of its mission and her interest in science. She only applied to Smithsonian positions and was eventually hired by **John Kress**. She has remained in the department ever since. MaryAnn is very proud of her time in Botany sharing that her position allows her to do everything except the science, from calling the plumber to fix a leak, to being the point of contact for foreign visitors trying to maneuver through the department and museum. These days MaryAnn loves to teach water exercise classes, cook and bake with her granddaughter, and spend time with her two grown daughters.

Robin Everly – Botany Librarian

Since 2008, Robin has managed the Botany and Horticulture Library located within the Department of Botany, used primarily by Botany and Smithsonian Gar-



Clockwise from top left: MaryAnn Apicelli, Robin Everly, Rose Gullede, and Erika Gardner.

dens staff. This is one of the 21 library branches in the Smithsonian Libraries and Archives system. Robin has worked with Botany staff on several projects assisting with literature searches related to their research. She routinely helps NMNH botanists and curators with their information requests, however, her assistance extends to graduate students, museum specialists, collections staff, research associates, and herbarium visitors. She is a current member of the Botanical Society of Washington currently organizing the monthly meetings and seminars virtually (previously meetings were held on site at NMNH). Robin has over 30 years of experience in the science information field with previous jobs at the National Cancer Institute, just out of college with her bachelor's degree in zoology, then as a database indexer at the National Agricultural Library. And after receiving her M.L.S., she worked as the horticultural librarian at the U.S. National Arboretum Library. She en-

joys writing and has published book reviews, and has written short articles for the newsletters *The Plant Press* and *Council on Botanical and Horticulture Libraries (CBHL)*, and blog posts for Smithsonian Libraries' *Unbound* and the *Biodiversity Heritage Library* blogs. In her spare time she enjoys observing nature, walking, traveling, and is a big podcast listener.

Erika Gardner – Core Collections Management

Since 2015, Erika has worked as the collections acquisition manager in the Department of Botany. Originally from Southern California, she completed a B.S. in Biology from California State Polytechnic University, Pomona, and a M.S. in Botany from Claremont Graduate University/Rancho Santa Ana Botanic Garden. Erika oversees all of the incoming and outgoing gift and exchange specimens for the herbarium. She also supervises a crew of 25+ volunteers who are primarily responsible for preparing all newly mounted spe-



Clockwise from top left: Carol Kelloff, Nancy Khan, Sue Lutz, and Ingrid Lin.

cimens that come into the department, around 10,000-12,000 a year. Erika is enthusiastic about cycling and solely bike commutes to work, 25 miles roundtrip. Her weekends are filled with long bike rides (60-100 miles) while examining and exploring the outdoors.

Rose A. Gullledge – Research and Collections Support

Rose has worked in NMNH for over 30 years splitting her time as a research assistant for both the Department of Botany and Invertebrate Zoology. Her first position was as a technician sorting field samples at the Smithsonian Oceanographic Sorting Center (SOSC) at the Museum Support Center (MSC) working in the benthic invertebrate section. Rose's background in phytoplankton ecology took her to the Smithsonian's Carrie Bow Cay Marine Field Station in Belize to collect tropical dinoflagellates which led to the publication, *Identifying Dinoflagellates* (Faust and Gullledge 2002). She was also involved in the Indian River Decapod Sur-

vey collecting crustacea specimens in Florida at the Museum's Marine Station at Ft. Pierce. Other projects led her to do SEM work on toxic dinoflagellates, *Theobroma* leaf surfaces, and hermit crab appendages. Rose currently assists **Larry Dorr** whose research is centered on the systematics of Malvales. She prepares scientific plates, maps, and designs PowerPoints. She copy-edits manuscripts and manages specimens for systematic and floristic projects. She has mentored college interns, hosted visitors, and sponsored volunteers assisting them with museum collections and research datasets. Rose enjoys baking (and sharing her creations), walking, art and science exhibits, and hunting for great coffee shops wherever she travels.

Carol L. Kelloff – Research and Collections Support

Carol has worked in NMNH for over 35 years. After graduating Elmira College, she started her master's degree at George Mason University while volunteering in the Department of Botany. She later was

hired and became the Assistant Director to the Biological Diversity of the Guiana Shield (BDG) Program under **Vicki Funk** where she handled budgets, travel, procurements, personnel actions, plant processing, and anything else that came across her desk. Carol completed her Ph.D. while working full time and doing fieldwork in Guyana. In 2006 she took on the role of research assistant with Funk and worked in the molecular lab on various tribes in the Daisy Family (Compositae) resulting in several publications. Carol is now a curatorial assistant in charge of the Compositae family shifting this collection out of the old Della Torre & Harms system to the new APG4 system. Carol enjoys fieldwork and continues collecting plants in the eastern United States, is the Archivist for the *Society for the Preservation of Natural History Collections* (SPNHC), loves travel, works on the family genealogy, collects stamps, and has a few other crazy hobbies.

Nancy Khan – Research and Collections Support

Nancy has been with the Department of Botany since 2010. She is currently engaged in the management of collections from the Pacific Islands that are held in the US National Herbarium, as well as research dissemination and program development for the Pacific Botany program. Most recently, she has contributed to the publication of two comprehensive Floras - Marquesas and Samoa. Nancy joined the Smithsonian in 2008 as a Research Technician in the Forest Ecology Lab at the Smithsonian Environmental Research Center (SERC). While at SERC she coordinated research activities as part of the HSBC Climate Partnership to study the impact of climate change on temperate forests. Prior to working at the Smithsonian, she developed citizen scientist initiatives and contributed to inventorying and monitoring surveys while serving as a field botanist for the National Park Service. Nancy is an avid gardener, enjoys biking and travel, horseback riding whenever possible, and lately, bird watching.

Ingrid Lin – Digitization and Data Management

Ingrid joined the Department of Botany in 2002 soon after finishing an internship at the National Gallery of Art's film

Continued on page 10



From left: Sylvia Orli, Alice Tangerini, and Meghann Toner.

Women of USNH

Continued from page 11

program. Before moving to Washington DC, she lived in southern California where she attended the University of Southern California (undergraduate) and the California Institution of the Arts (graduate) studying film and fine arts. Her dream job was to work in a museum as a conservator-restorer which led her to the NMNH. She was initially offered a slide collection inventory project, but that lasted only one afternoon. Because of her background in film, Ingrid was asked to photograph herbarium sheets. She accepted the position and never left. She still continues to preserve the herbarium collection through digital photography. Her other responsibilities include handling all multimedia needs for the department, serving as the main contact for inquiries on specimen images and image copyright, and importing images and data into EMu, the museum's collections management database. She especially enjoys photographing bulky specimens, such as cacti, which are quite stunning. Ingrid enjoys walking, kayaking, and spending time with her rescue dog, Britt, as well as family and friends.

Sue Lutz – Acting Core Collections Manager

Sue has worked at the NMNH for over 35 years. Her career began on the Smithsonian research vessel *Marsys Resolute* working on an ecosystem analysis of Gouldsboro Bay, Maine. For three years she lived and worked on the ship doing field work on a mariculture project in the far eastern Bahamas and the Turks & Cai-

cos Islands. Her work and positions in the Department of Botany have varied over the years including managing marine field site logistics, mesocosm modeling of marine and estuarine ecosystems, and research assistance to several curators. The research specialization varied from coral-line algae, lichens, and the higher plant families (Vitaceae and Araliaceae). Much of this assistance involved field work and processing of collections, as well as lab work, in particular, microanatomy with scanning electron microscopy. Today she serves as the acting Collections Manager and has been in that role for several years. In her spare time she enjoys travel, perfecting her vegetable garden, and finding the perfect beach with a good book in hand.

Sylvia Orli – Digitization and Data Manager

Sylvia has been working in NMNH for almost 30 years. She started her Smithsonian career in the Division of Birds as a field worker studying the Breeding Bird Survey plots of the Appalachian Mountains. After this position ended, she worked as a technician in the Division of Mammals before being hired in the Department of Botany. Sylvia has worked on all sorts of interesting projects while in Botany, including studying pollen grains, creating a Flora of the Washington-Baltimore Area, designing websites for the department, and lastly and most recently, digitizing the entire herbarium. And this project is almost done, 4+ million records! At home, Sylvia likes to hike and bike with her family, play tennis and pickleball, work in the garden, and do crossword puzzles with her two cats (they aren't much help).

Alice R. Tangerini – Botanical Illustrator

Alice has been working in the Department of Botany as Staff Illustrator since 1972. She began her career working as a summer freelance artist for Lyman Smith in 1968 and became a full-time employee after graduating with a B.F.A. from Virginia Commonwealth University. To date, she has made over 1,500 illustrations of plant specimens in pen and ink and graphite, and more recently, in digital media for publications for the Department's research scientists and associates. A new species of bromeliad, *Navia aliciae*, was named in her honor by authors **Lyman B. Smith** and **Harold Robinson** after Alice found new characters which changed the previous written description. Alice also manages and curates the Botanical Art Collection in NMNH.

Alice's illustrations have been published in numerous journals, monographs, and floras and nature books. Her work has been exhibited in annual exhibits for the Guild of Natural Science Illustrators (GNSI) (1976-2019), in the traveling exhibits *Losing Paradise* (2009), and *Botanical Art Worldwide: America's Flora* for the American Society of Botanical Artists (ASBA) (2017-2019). She has been teaching classes in botanical and scientific illustration since 1976 at gardens, universities, and botanical institutions. She has received awards from the ASBA (2008) and the GNSI (1999) and most recently from the Linnean Society—the Jill Smythies Award for excellence in botanical illustration (2020). Her work is also in the collections of the Hunt Institute for Botanical Documentation, Pittsburgh, Pennsylvania, the

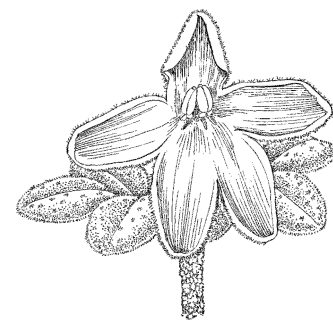
Brooklyn Botanical Garden, Brooklyn, New York, and the Italian American Museum, Washington, DC.

Meghann Toner – Core Collection Management

Meghann has been a part of the Core Collection Management team in the Department of Botany for almost ten years. She moved to Washington, D.C. from Colorado where she was a Herbarium Database Specialist at the Denver Botanic Gardens, The Kathryn Kalmbach Herbarium of Vascular Plants (KHD), and the

Sam Mitchel Herbarium of Fungi (DBG). She attended school at the University of Colorado, Boulder, and the University of Leicester, U.K. Meghann's responsibilities include processing outgoing loans to researchers around the world and managing the return of collections, handling over 10,000 specimens a year. Once back in the department, these specimens need a place to be stored, and she helps oversee space in the herbarium for the 4+ million objects in the collection. Meghann also assists research visitors navigate the collections in the herbarium and helps find them the

perfect work station near their research groups. Of all the plant families, she is especially fond of Cactaceae and Solanaceae.



Untangling the roots of plant genomes: Supporting a ‘moonshot’ for botany

Adapted from the Botanical Research Institute of Texas

Research featured in *Proceedings of the National Academy of Sciences* (119: e2115640118; <http://doi.org/10.1073/pnas.2115640118>) highlights the progress of plant genomics and includes a roadmap for the enormous task of sequencing the genomes of plants worldwide.

The article, titled “Green plant genomes: What we know in an era of rapidly expanding opportunities,” underscores the significance of this massive endeavor.

“Nearly half a million species of plants inhabit the Earth today and the secrets to understanding nearly everything about them is hidden in the sequences of their DNA (the plant genome),” said **W. John Kress**, senior author of the paper and Curator Emeritus at the Smithsonian. “Plants are the foundation of environments across the planet and deciphering their genomes will be a game changer for understanding nearly all aspects of our own lives, from improving foods and medicines to inspiring artists and enhancing ecosystem stability.”

The article highlights the contributions of Global Genome Initiative for Gardens (aka GGI-Gardens), based at the Fort Worth Botanic Garden and Botanical Research Institute of Texas (FWBG|BRIT) and funded by the Smithsonian Institution. Co-author of the article, Morgan Gostel, is the director of GGI-Gardens and has managed the international partnership since it began in 2015. To date, GGI-Gardens has supported the collection and preservation of genomic tissue from more than 10,000 species of plants.

“The biggest challenge to jumpstarting an ambitious genome sequencing project like the Earth BioGenome Project is getting access to high-quality tissue from almost half a million species of plants on Earth,” Gostel said. “With our current technology and expectations for where sequencing technologies are headed in the future, high-quality plant tissue, either from well-preserved or fresh collections is critical.”

Botanic gardens offer a good starting place for tissue collection. With more than 3,000 botanic gardens around the world, they contain more than a third of all plant species. “This is precisely the role that GGI-Gardens is playing: connecting genome researchers to botanic gardens, advancing our knowledge of the role that plants play in our lives, and tapping into the marvelous power of gardens,” Gostel said.

The effort required to sequence plant genomes is no small task, but it is the goal of the Earth BioGenome Project, “a ‘moonshot’ for biology, [that] aims to sequence, catalog, and characterize the genomes of all of Earth’s eukaryotic biodiversity [including plants, animals, and fungi] over a period of ten years.” The article, one of ten published this week in a Special Feature in *PNAS*, is co-authored by an international group of plant scientists and outlines a map that will help researchers worldwide achieve this ambitious goal.

An organism’s genome contains all the instructions necessary to carry out the processes of life and it should come as no surprise that genomes are extremely complex. Sequencing and assembling whole

genomes will allow researchers to understand how species are related to and have evolved from other species; how they perform essential biological functions; and how they interact with and respond to their environments. Sequencing whole plant genomes is especially complicated compared with other groups of organisms for several reasons, but largely because there are so many species of plants and they have highly variable and often extremely complex genomes.

Consider that as of today’s date, there are just 883 whole genome sequences available for green plants compared with 2,019 whole genome sequences available for vertebrates; yet there are more than 400,000 species of green plants compared with just 73,340 species of vertebrates. The variation in genome size among plants is also astounding—some plants have a genome as small as just 65,000 individual nucleotides (the molecules that make up the four “base pairs” in the genetic code) and as large as nearly 150 billion nucleotides. There is incredible complexity involved with understanding plant genomes.

Untangling this complexity is at the root of this article. The authors present a roadmap that will help the global scientific community collect samples using new partnerships such as the Global Genome Initiative for Gardens and Global Genome Biodiversity Network, as well as the latest advances in software and technology that will help researchers sequence and assemble highly complex plant genomes. With this new perspective, botanists will be able to advance plant genome sequencing like never before.

Specimen collected by Smithsonian botanist in the 1920s determined to be a new species nearly a century later

By Jerald Pinson

Florida Museum of Natural History

A plant specimen that had been collected in northwestern Haiti in 1929 by Smithsonian botanist E.C. Leonard has led researchers from the Florida Museum of Natural History to the discovery of a new plant species, *Castela senticosa*, which they recommend be designated as endangered. The plant, which grows as a small bush sheathed in an imposing layer of spines, was recently found during a survey to catalog the flora of the Martín García mountain range in the Dominican Republic and compared to the Leonard specimen.

“We were collecting everything we came across with the goal of having a complete species list for the entire mountain range,” said lead author Lucas Majure, an assistant curator at the Florida Museum of Natural History and curator of the University of Florida Herbarium.

Hispaniola’s mountains support large swaths of intact tropical dry forests, highly diverse ecosystems that — like the rainforests they border — are globally imperiled due to the combined effects of deforestation, overharvesting and climate change. But although they face the same threats, the destruction of a tropical dry forest might mean the loss of considerably more species. That’s because rainforests are often found in lowland basins, where conditions like rainfall, temperature and soil type are similar over large areas. While species diversity is high, many rainforest plants can have distributions that span hundreds of miles.

Dry forests can be just as diverse, but their plants tend to be geographically restricted; up to 73% of plant species of dry forests in the American tropics are endemic to a particular region. Plants growing on Caribbean islands, which have been separated from continental landmasses for more than 50 million years, have an extra layer of isolation built in. As a result, much of the Caribbean flora can be found nowhere else on Earth.

“The overall diversity is amazing,” Majure said. “If you go across Hispaniola, Cuba and Jamaica, there are quite a few plant groups that make these forests incredible places to work.”

Along the slopes of the Sierra Martín García alone, Majure and other researchers from the U.S. and Dominican Republic identified more than 700 plant species during their survey. But when Majure and Teodoro Clase of the Dominican Republic’s National Botanical Garden stumbled across a non-descript shrub halfway up the mountain, both botanists were stumped. The plant was largely a tangle of thorns, with few leaves and no flowers or fruits, which left little in the way of identifying characteristics. They carefully collected and pressed one of the branches, which Majure took with him back to the Florida Museum for further study.

After returning from the field, Majure set to work determining the identity of the

plant. After documenting the diversity of Caribbean plants for almost a decade, he had a good reference frame for what the species wasn’t. But finding a positive match would require some careful sleuthing. “This sat around for a while and just bothered me to no end because I couldn’t figure it out,” he said.

He found a strong candidate while sifting through the digital records of plant specimens stored at the New York Botanical Garden. There, tucked away among more than 7 million preserved plants, was a small, severed branch with a profusion of pale-green thorns. The specimen had been collected in northwestern Haiti in 1929 by Smithsonian botanist E.C. Leonard (1892-1968). Leonard was a member of the Divi-



Although *Castela senticosa* was only just described as a new species, it was actually collected and preserved by a Smithsonian botanist in 1929 and later misidentified as another rare species, *Castela depressa*, in 1985. (photo courtesy of New York Botanical Garden)

sion of Plants at Smithsonian's National Museum and had collected in Haiti in 1920, 1925-26, and 1928-29. He has about 30 species named for him, mostly from Haiti.

The Leonard specimen that Majure came across had been identified as *Castela depressa*, a species endemic to Hispaniola and related to the highly invasive tree of heaven that's spread across much of North America. It seemed Majure had found a match for the newly collected plant.

To confirm the identification, he extracted DNA from both the old and new collection, along with related species, finding that the nearly century-old plant was indeed the match he'd been looking for. But it wasn't *Castela depressa* or anything else that had ever been collected.

Instead, Majure had discovered something entirely new. Given that it had only ever been collected twice, it was likely also something incredibly rare. But to officially name a new species, he would need to find another specimen that had both flowers and fruit, which would allow him to paint a complete picture of what the plant looked like.

So Majure went back to the Dominican Republic with one of his Ph.D. students, Yuley Piñeyro, to hunt for the elusive plant. When they hiked out into Hispaniola's dry tropical forests in late spring, however, the climate was living up to its name. "It was incredibly dry, and I thought there was no way we were going to find this thing in flower," Majure said.

But after hiking to about mid-elevation, Piñeyro spotted a flash of red against the backdrop of dull-green vegetation, which upon closer inspection turned out to be the exact plant they were looking for. One of the only things in full bloom that early in the year, the plant had small, white to cream-colored flowers and crimson, scythe-shaped fruit resembling miniature peppers.

"Most other species in these forests have totally lost their leaves during the dry season, but it appears the strategy of this *Castela* is to flower and fruit while everything else is dormant. That way, it's fully exposed to pollinators and dispersers," Majure said.

It's unclear what pollinates the plant's flowers or eats its fruit, but Majure thinks its natural history might provide a clue. *Castela senticosa* likely originated on the

island, but it's closely related to species native to the Sonoran Desert in western North America. Since the seeds are too large to be dispersed by winds, they must have been transported long-distance.

"We think that birds are the primary dispersal agents here, but we don't actually have any good hypotheses about what birds might have been dispersing something all the way from the Sonoran Desert to the Caribbean," he said. "It's still a bit of an enigma."

Castela senticosa isn't the first, nor will

it be the last new species Majure and Clase describe from Hispaniola's dry forests. The pair recently collaborated on naming a new plant with leaves as small as Aspirin pills, and there are more waiting to be described, Clase said.

"There are several very rare and endemic species that grow in Hispaniola's dry forests that make them important targets for conservation, and future studies will reveal even more discoveries," he said.

The study was published in *Systematic Botany*.

DEPARTURES



John Boggan, Botanical Type Register Manager for the US Herbarium, retired at the end of March 2022. Boggan began his career in the Department of Botany in 1991 as a contractor for the Biological Diversity of the Guianas program, working with **Vicki Funk** and **Carol Kelloff** as their data manager. He then went on to become a research assistant for **Larry Skog** and co-authored several papers on Gesneriaceae, and also worked for **Jun Wen**.

He became the Type Register Manager in 2003 and was responsible for the maintenance and upkeep of the Type collection, which currently numbers around 115,000 botanical

Type specimens. He also managed the Botanical Type Specimen Register and added approximately 500-1000 new Type records per year to Botany's data catalog, making the US Herbarium Type Register one of the finest and most complete in the world. Before retirement, Boggan rearranged the Type Herbarium to reflect the APG IV (Angiosperm Phylogeny Group) conversion ongoing in the general herbarium. Boggan was particularly good at finding a Type designation from a few clues on a specimen, and he was amazing at reading bad handwriting on labels. We will miss his talents and dedication to the collection.

How two key figures brought cherry trees to the U.S.

By Julia Beros

As Spring begins to peak through the last dregs of winter and sweep away those straggler snowflakes, the delicate blossoms of cherry trees (*Prunus × yedoensis*) that cover the Washington D.C. area return to invite a rumination on life and the ephemeral while also recalling the origins of this celebration through a botanical and cultural lens. As many of the associated events with the National Cherry Blossom festival suggest, these diaphanous blooms are the signal of an ever-renewing friendship and cultural exchange between the United States and Japan, but are further imbued with a rich history of botanical exploration and inquisition that has roots with a young intern sent out to the Naples Zoological Station in Italy with support from the Smithsonian Institution in the late 1800s.

While *Hanami*, *Sakura Matsuri*, or Cherry Blossom Festivals are observed globally these days (with gifted plantings lining parks in major cities from Helsinki to Rome, New York, Macon, and Toronto) Washingtonians and tourists alike have been convening beneath the cherry blossoms here since the early 1900s to honor a Japanese tradition that goes back hundreds of years. After returning from a trip to Japan, travel writer, photographer, and notable member of the National Geographic Society Eliza Scidmore petitioned (persistently for 24 years) for plantings of Japanese cherry trees in the nation's capital. Although the first batch of trees sent over was infamously burned due to a possible infestation of insects and nematodes (as the trees were choice specimens with long established roots and healthy buds that unfortunately housed long established pests), the following trees were carefully inspected and planted to line the Tidal Basin. While there is much discussion over the “semantics” of how these trees came-to-be and their symbolic designation, they are also an example of the horticultural ingenuity and curiosity of the times that fueled the general interest in expanding botanical horizons. The successful naturalization of these now iconic trees was facilitated by botanical explorer David Fairchild.

As a young enterprising adventurer, Fairchild began his career on a Smith-



Cherry blossoms around the Tidal Basin, Washington, D.C., 1920.
Smithsonian Institution Archives, Acc. 12-492, Image No. SIA2012-6444.

sonian Institution grant to a Naples Zoological Station. It was on this first voyage to Italy that he met Barbour Lathrop who took great interest in Fairchild and his potential in exploration, and subsequently underwrote and funded many of his future botanical trips. Acting as botanist, explorer, and occasionally spy, Fairchild is credited with introducing thousands of economically significant and (gastronomically appealing) crops that now seem commonplace: kale, avocados, quinoa, and mangos, as well as the occasionally less desirable plants that have been a bit *too* successful at outcompeting many native species, including kudzu. While his work was at times covert and others an act of diplomacy, he helped to create agricultural relationships that expanded the agro-economy of the U.S. and diversified the nutrition and palates of Americans.

With his horticultural intel and seed introduction accolades in tow, Fairchild spent many years working for the U.S. Department of Agriculture (USDA), and it was during this time he returned from a trip to Japan, still dazed as Scidmore had been by the beautiful cherry blossoms. He quickly learned that Scidmore had already been negotiating a way to bring cherry blossom plantings to the region, giving him the push to make it a reality. Strategi-

cally he arranged for a shipment of cherry trees to his home in Chevy Chase, Maryland, where he invited guests to enjoy displays of the lightly scented billowy-petaled flowers in his yard. His home, just off Jones Bridge Road, was known intimately as “In the Woods” where beyond various types of cherry trees, he cultivated unique and rare plants, which continue to grow to this day.

With proof that these cherry trees were both viable and awe-inspiring (and Fairchild's authority through affiliation with the USDA) Scidmore's plan to bring the experience of *Hanami* to the U.S. would begin. Not long after in 1926, local developers Edgar Kennedy and Donald Chamberlain with help from Charles Jerman, made plans for a new residential neighborhood in Bethesda, Maryland on a plot of land they originally sought to turn into an amusement park. Struck by the quiet splendor of the cherry blossoms downtown they consulted Fairchild in bringing yoshino cherry trees to their new development. Yoshino cherries were grafted onto American stock that lined all the streets, both developed and yet undeveloped, and backed by rows of Norway maples to provide fall foliage colors and shade (most of which were later “sacrificed” to the beauty of the cherry trees). Within five years, 2,000 cherry trees lined the new

Kenwood neighborhood, today a local *Hanami* attraction site with festivities and all.

This centuries-old tradition rooted in Japanese political, religious, and social history now spans many continents and many iterations of celebration. With peak blooms trending notably earlier and earlier since the 1800s, researchers also look to this cultural phenomenon and seasonal event as an indicator of climate change. The transient nature of the explosive blooms of cherry blossoms, often peaking all at once and with such temporal fragility quickly fall to the earth and carpet the ground with their once showy plumage, paralleling the crowds of excitement who come to gather and celebrate, relax and enjoy food and company, and quickly disperse leaving only traces of their short-lived debauchery. Similar phenomena occur with magnolias and crab apple trees, whose bright petals and richly fragrant blossoms are an equally dazzling and fleeting display of the cycles of life. It's a fascination not exclusive to flowers though, as "leaf-peeping" can elicit a similar craze among nature enthusiasts. Throughout North America leaf-peepers track the turning of the leaves to watch brilliant displays of fall foliage turn entire landscapes into a lush palate of yellow, orange, and red. Similarly in Japan and Finland, many prepare for and track the turning of the leaves for what is known as *Momojigari*, and *Ruskaretki*. In some ways these mass tree-viewing events reunite us with the seasons and remind us of the natural cycles we are constantly taking part in.

As for the two key figures in bringing the cherry trees to the U.S. Scidmore and Fairchild's contributions can be found in many places. Scidmore herself often returned from trips with photographs and artifacts that she donated to the U.S. National Museum and developed relationships with many Smithsonian curators to support each other's work. Many of these artifacts are still held by the Smithsonian Institution. Likewise, pieces of Fairchild's work, including travel journals, have remained in Smithsonian Institution archives and give further insight into his thoughts and travels.

While both Scidmore and Fairchild produced work that has paved a legacy in agricultural advancements and cultural exchange, there remains a conflicting legacy as well in colonialism and often the ex-

ploitation of other cultures that was characteristic of exploration at the turn of the century. The endurance of the attempt to cultivate cross-cultural exchange and mutually beneficial relationships is perhaps the greatest outcome from the foundations of this work. Cultural and botanical exchange is not just a token display of friendship or intent at goodwill, but it invokes a deeper exploration into one another's lives, and invites us to show respect and take the

responsibility to learn more about each other and how we see and share the world. It invites us as well to return the exchange and keep the cycle going to return for a new season. Through an invitation to join in a tradition of reverence for nature and its relationship to our own cycles, the seasonal awakening of cherry blossoms reminds us to participate consciously in our world and find gratitude for the impermanent but returning grace of the Spring.



HONORS & AWARDS

The National Museum of Natural History (NMNH) presented the 2021 Peer Recognition Awards on January 20, 2022. Award recipients are individuals and teams who have given their time and talent to the museum above and beyond what their jobs call for, and to those who have done something that makes a difference in the outside community, for the museum, or for the larger Smithsonian community. The Peer Recognition Award Committee is composed of nine Museum staff members representing a cross-section of the entire museum community.

Seventeen awards were presented during the online Zoom ceremony, hosted by Kirk Johnson (Sant Director of the National Museum of Natural History) and Bob Corrigan (Office of the Deputy Director). From the Department of Botany, **Gary Krupnick** was the proud recipient of the Diversity Equity and Inclusion Action Award.

During 2021, the 22 members of the NMNH Council for Inclusion, Diversity, Equity and Accessibility (IDEA), which included Krupnick representing the Department of Botany, volunteered

to do their part to improve work life for everyone in the NMNH community. The IDEA Council has taken a bold leadership stance in partnership with the Museum's leaders as their approach to change.

With the help of the Smithsonian Organization and Audience Research (SOAR), the Council conducted a survey to better understand perceptions of staff, contractors, affiliates, and volunteers about inclusivity, diversity, equity, and accessibility at NMNH. The findings enabled the Museum's voices to guide the IDEA Council's plans for improving culture and advancing IDEA in the Museum. The plan has become a model for excellence both at the Museum and across the Smithsonian by featuring realistic concrete goals, practical tactics, performance indicators, and critical success factors.

While the road ahead is neither straight nor certain, the IDEA Council has given us a very bright light to shine ahead of us and the confidence that we can walk that road together to a brighter—more inclusive, diverse, equitable, and accessible—future.

TRAVEL

Stuart Davies traveled to Panama (3/6/22 – 3/12/22) to meet with the new STRI Director, meet with the ForestGEO team, work on soils, and start (after a 2-year delay) the 9th re-census of the BCI 50-hectare plot, the oldest plot in the global ForestGEO network.

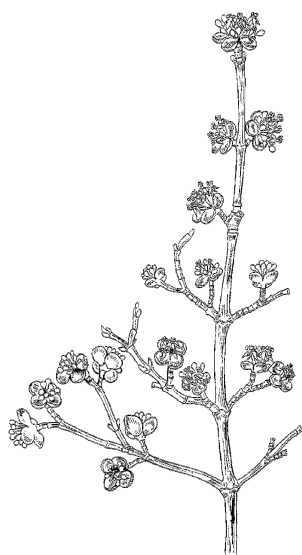
Carol Kelloff and **Mark Strong** traveled to Florida and Alabama (9/4/21 – 9/19/21) to collect rare and endangered plants as part of the Global Genome Initiative (GGI) Project.

Larry Skog traveled to Sarasota, Florida (1/17 – 1/19) to put names of recently acquired Gesneriaceae in the Selby herbarium (SEL) at Selby Botanical Gardens.

Jun Wen traveled to North Carolina, South Carolina, Georgia, Florida, Mississippi, Louisiana, Tennessee, and Kentucky (8/30/21 – 9/13/21) with **Sue Lutz** and to Texas (9/19/21 – 9/28/21) to collect Vitaceae and Rosaceae.

STAFF ACTIVITIES

During the pandemic, **Larry Skog** has been volunteering at the George Mason University herbarium (GMUF) in Fairfax, Virginia to assist in rearranging the herbarium, identifying, and filing specimens from the recent acquisition of the orphan herbarium from Lord Fairfax Community College (now Laurel Ridge Community College).



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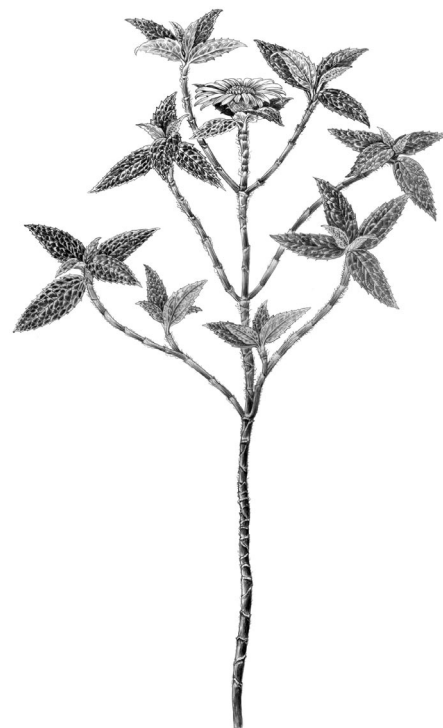
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ART BY ALICE TANGERINI

Corytoplectus speciosus (Poepp.) Wiehler

Corytoplectus speciosus is native to high-elevation cloud forests of northwestern South America and now in cultivation, grown for its colorful leaves and yellow and orange flowers. The plant was drawn by Alice Tangerini for the Gesneriaceae of the Flora of Peru project and published to illustrate the species in Rodríguez-Flores & Skog (*Selbyana* 29: 92-124; 2008). In drawing *C. speciosus* Tangerini used images from slides that were taken in the field. A pressed specimen (L.E. Skog, J.E. Skog, Lamas & Schunke 5168) was used for the flower, fruit, and seed details. The slide images provided valuable information on the leaf surfaces and patterns of coloration.



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