

The Plant Press



Smithsonian
National Museum of Natural History

New Series - Vol. 6 - No. 4

October-December 2003

Botany Profile

Zingiberales: An Order of Magnitude

By Robert DeFilipps

The Head of Botany, W. John Kress, is eminently adapted to function in the milieu of field exploration, in the laboratory while investigating the molecular phylogenetics of plants, and in the demanding role of an administrator whose decisions are foremost in shaping the progress and welfare of plant science at the Smithsonian Institution.

Kress was born in 1951 in Alton, Illinois. His undergraduate education was pursued at Harvard University, where he graduated in 1975 with a B.A. degree *Magna Cum Laude*, and produced an honor's thesis, advised by P. Barry Tomlinson, entitled "The Pollination Ecology of *Rhizophora mangle* L. – the Red Mangrove."

Graduate studies were undertaken at Duke University (Durham, North Carolina), with advisor Donald E. Stone, and culminated in a Ph.D. (1981) with a dissertation on "Reproductive Biology and Systematics of Central American *Heliconia* (Heliconiaceae)." His professional career began with a position as Research Scientist in the Botany Department at Duke University (1983-1984), and shortly thereafter he became Director of Research at Marie Selby Botanical Gardens in Sarasota, Florida from 1984-1988. The Smithsonian Institution was joined in 1988 at the curatorial level, and he is currently a Research Scientist and Curator in the Department of Botany, National Museum of Natural History. In 1997 Kress was appointed Chairman of Botany, which he fulfills to the present day.

The locus of Kress' research essentially resides in the petaloid monocot

order Zingiberales, which takes its name from the gingers. This geographically widespread and morphologically diverse assemblage of families comprises the cannas (Cannaceae); heliconias (Heliconiaceae); prayer plants (Marantaceae); bananas (Musaceae), the worldwide providers of food and fiber, whose fruits and leaves contain "dopamine," a neurotransmitter also found in the human brain; the lemur-pollinated traveler's trees (*Ravenala*) of Madagascar, as well as the South African (*Strelitzia*) and South American (*Phenakospermum*) birds-of-paradise (Strelitziaceae), which are pollinated respectively by diurnal sunbirds and nocturnal bats; the horticulturally desirable *Costus* (Costaceae); and gingers (*Zingiber*) with their pungent essential oils having antineoplastic, anticholesteremic, depressant, and cardiogenic effects (Zingiberaceae). Work is aided by his valuable assistant, museum specialist Ida C. Lopez, and a host of graduate students including Chelsea Specht (New York University), Kyle Williams (Duke), Tanya Rehse (Duke University), Norman Bourg (University of Maryland), and Vinita Gowda (George Washington University).

An interest in the Ginger Order was developed along a sort of time-line, basically starting many years ago with enrollment in Tomlinson's summer course on tropical monocot morphology at the Fairchild Tropical Garden in Miami, which brought with it an inspiring opportunity to stay in David Fairchild's house for three months with access to the fine library while seeing all the economic plants introduced to Florida via Fairchild's world

travels. This episode was followed at various intervals by field trips to Colombia with Harvard's Richard Evans Schultes, and then to Amazonian Peru with Timothy Plowman, during which Kress saw *Heliconia* in the field for the first time.

These experiences were the core facilitators of his interest in graduate studies with Stone, on classification and pollination biology of the Heliconiaceae. Trips to Costa Rica and Panama began to instill in Kress a lifelong interest in biological conservation and the remedies for forest fragmentation. In Costa Rica he encountered pristine rain forests, only to return later and witness the selfsame areas in a state of decimation and biotic endangerment. His strong interest in conservation was recently manifested in statistical studies focusing on hotspots of plant endemism in 84 Indo-Pacific ecoregions, conducted with co-author Gary Krupnick (*Biodiversity and Conservation* 12: 2237-2253. 2003).

The scope of research done by Kress is, in a word, formidable. That is because he has inquired (often with collaborators) into so many different subdisciplines of botany, ranging from taxonomy, systematics, conservation, and habitat studies, all the way up to and including "cutting edge" molecular work with isozymes and DNA sequence analyses, resulting in phylogenetic and cladistic evidence of interrelationships, data which helps to inform our collective appreciation of evolutionary

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Walter Adey traveled to Halifax and St. Johns, Canada (6/15–10/1) to conduct ongoing research.

Paula DePriest traveled to Mobile, Alabama (7/26–7/29) to attend the Botany 2003 meeting; and to Mongolia (8/12–9/7) with **Gregory McKee** to study lichens.

Laurence Dorr traveled to London, England (7/17–8/14) to conduct research at the Royal Botanic Gardens, Kew; and to Caracas, Venezuela (9/10–9/25) to collect plant specimens in the Andes (Guirigay National Monument and Guaramacal National Park) and to study plants at the herbarium in Guanare (PORT).

Robert Faden traveled to Kenya, Ethiopia, and England (9/3–10/5) to do herbarium and field work in Kenya, to deliver a paper at the XVIIth Congress of the Association for the Taxonomic Study of the Flora of Tropical Africa (AETFAT) in Addis Ababa, Ethiopia, and to conduct research at the Royal Botanic Gardens, Kew.

Maria Faust traveled to Ft. Pierce, Florida (7/13–7/25) to conduct ongoing research.

W. John Kress traveled to Myanmar (6/9–6/30) to conduct ongoing research;

and to Aberdeen, Scotland (7/4–7/11) to attend the annual Association for Tropical Biology and Conservation (ATBC) meeting.

Gary Krupnick traveled to Duluth, Minnesota (6/28–7/3) to attend the annual meeting of the Society for Conservation Biology.

Mark and Diane Littler traveled to Ft. Pierce, Florida (6/2–7/27) to conduct ongoing research.

Dan Nicolson traveled to Bronx, New York (6/30–7/3, 7/27–7/30, and 9/14–9/17) to continue work on the *Taxonomic Literature edition 2 (TL-2)* at the library of the New York Botanical Garden; and to Uppsala, Sweden (8/19–8/25) to attend a council meeting of the International Association for Plant Taxonomy (IAPT).

Paul Peterson traveled to Mobile, Alabama (7/27–7/31) to attend the Botany 2003 meeting; and throughout Mexico (8/18–9/24) to collect grass specimens.

Laurence Skog traveled to Mobile, Alabama (7/25–8/1) to attend the Botany 2003 meeting; and to Sarasota, Florida (8/28–9/5) to conduct research at the Marie Selby Botanical Gardens.

Alain Touwaide traveled to Rome, Italy (8/26–10/13) for the second part of an Earthwatch expedition studying Renaissance printed herbals at the National Library of Rome.

Warren Wagner traveled to Mobile, Alabama (7/26–7/31) to attend the Botany 2003 meeting; and to Uppsala, Sweden (8/19–8/25) to attend a council meeting of the International Association for Plant Taxonomy (IAPT).

Liz Zimmer traveled to Chico, California (6/19–6/27) to attend the meeting of the Society of Systematic Biologists; and to New London, New Hampshire (8/3–8/8) to attend the Gordon Research Conference on "Evolutionary and Ecological Functional Genomics."

Visitors

Walter Holmes, Baylor University; Neotropical *Mikania* (Asteraceae) (7/14–7/26).

Helen Kennedy, University of British Columbia; Guianan Marantaceae (7/17–8/4).

Xochitl Munn, University of Texas; Personal Collections (7/29).

K. Olusola Ogunwenmo, Babcock University, Ogun State, Nigeria; African *Ipomoea* (Convolvulaceae) (8/1).

Rosa Cerros-Tlatilpa, Rancho Santa Ana Botanic Garden, California; *Aristida* (Poaceae) (8/11–8/16).

Cynthia Frasier, Rutgers University; *Strychnos* (Loganiaceae) (8/11–8/14).

Bonnie Farrell, Rutgers University; *Aconitum* (Ranunculaceae) (8/14).

Richard Mack, Washington State University; *Bromus* (Poaceae) (8/15).

Melissa Islam, Colorado State University; *Ziziphus* (Rhamnaceae) (8/18–8/20).

Darin Pennys, University of Florida, Gainesville; Miconeae (Melastomataceae) (8/18–8/20).

Shigeo Masuyama, National Museum of Japan; Pteridophytes (8/19–8/20).

Tetsuo Koyama, Makino Botanical Garden, Japan; Cyperaceae, Smilacaceae (8/20–8/22).

Catherine Phillips, Huntington Botanical Garden, California; Humbert & Swingle Madagascar Collections (8/21).

Daniel DeBouck, International Center for Tropical Agriculture, Colombia; *Phaseolus* (Fabaceae) (8/25–8/30).

Guillermo Pino, Universidade de San Marcos; Peruvian Succulents (*Peperomia*, *Echeveria*) (8/25).

Debbie Crabtree, National Food Processors Association, Washington, D.C.; Leaf Identification (9/5).

Jerrold Davis, Botany Department, Cornell University; Poaceae (9/8).

Elizabeth Hermsen, Bailey Hortorium, Cornell University; *Itea* (Saxifragaceae) (9/15–9/19).

Mario Sousa, Universidad Nacional Autónoma de México (UNAM); *Lonchocarpus* (Fabaceae) (9/18–9/22).

Bruce Hoffman, University of Hawaii; Suriname Lianas (9/24–10/7).



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A Global Strategy for Plant Conservation

Conservation activities can be roughly divided into two categories: 1) the assessment of the conservation status of species and habitats, and 2) the design and implementation of management strategies for conserving species and habitats. As botanists working in natural history museums, herbaria, and botanical gardens we can make the most significant contribution to the first category: assessment of threat. The recent adoption of the "Global Strategy for Plant Conservation" (GSPC) by the Sixth Conference of the Parties to the Convention on Biological Diversity (CBD) provides an international mandate for taxonomists to pursue these assessment activities. The GSPC is in some ways a radical departure from other initiatives spawned by the CBD in that it sets concrete targets to be achieved in plant conservation by the year 2010. These 16 outcome-oriented targets fall into five categories: understanding and documenting plant diversity, conserving plant diversity, using plant diversity sustainably, promoting education and awareness about plant diversity, and building capacity for the conservation of plant diversity.

To understand and document plant diversity the GSPC also sets explicit goals: "[to] document the plant diversity of the world, including its use and its distribution in the wild, in protected areas and in *ex situ* collections; [to] monitor the status and trends in global plant diversity and its conservation, and threats to plant diversity, and [to] identify plant species, plant communities, and associated habitats and ecosystems, at risk, including consideration of 'red lists'; [to] develop an integrated, distributed, interactive information system to manage and make accessible information on plant diversity; [and to] promote research on the genetic diversity, systematics, taxonomy, ecology and conservation biology of plants and plant communities, and associated habitats and ecosystems, and on social, cultural and economic factors that impact biodiversity, so that plant diversity, both in the wild and in the context of human activities, can be well understood and utilized to support conservation action." This mandate is highly significant and supportive of what we do as plant taxonomists and ecologists.

The specific targets to reach by the year 2010 as set out by the Global Strategy are to produce a widely accessible working list of known plant species, as a step towards a complete world flora; to make a preliminary assessment of the conservation status of all known plant species, at national, regional and international levels; and to complete the development of models with protocols for plant conservation and sustainable use, based on research and practical experience. To say the least as we approach the start of 2004 this set of targets is a tall order for six years time.

Botanists at the National Museum of Natural History are significantly contributing to the goals of the

GSPC in our basic floristic and monographic work. With taxonomic specialists in a score of plant families, with floristic projects in nearly a dozen countries, and with training programs reaching foreign students around the world, we are making noteworthy progress in documenting and understanding the extent and distribution of plant diversity worldwide.

In addition to the basic taxonomic documentation provided by individual curators, the Department of Botany at NMNH is involved in a number of collaborative projects and initiatives which directly address the targets of the Global Strategy. Our Plant Conservation Unit (PCU), the central contributor to conservation in our department, is the only program in any department at NMNH that is dedicated exclusively to conservation activities. The PCU serves as liaison between curators working on conservation projects in the Department as well as between Botany and non-government conservation organizations external to the Smithsonian Institution through partnering and participation in various working groups. Recent activities of the Plant Conservation Unit have focused on a number of projects:

- Our 4.7 million specimens in the US National Herbarium are a rich resource of information about plant diversity. To assess the conservation status of this diversity the PCU recently initiated a survey of the threatened, endangered, and extinct species represented in our herbarium collections based on the listings in the 1997 *IUCN Red List of Threatened Plants* and the 2002 *IUCN Red List of Threatened Species*. The conservation status of species included in the various floristic projects and checklists underway in the Department can be assessed in the same fashion.
- Botanists spend a good portion of their research time conducting field surveys and inventories of plants in critical ecosystems around the globe. This exposure "on the front lines" gives our scientists first-hand conservation experience as habitats are degraded and species are threatened with extinction. The unique and important perspective held by curators working in the Museum is being distilled in a volume entitled *Plant Conservation: A Natural History Approach* that has been coordinated and edited through the PCU. The book manuscript is nearly complete and under review at the University of Chicago Press.
- Our partnership with the United States Botanic Garden (USBG) continues to grow with the recent addition of a Conservation Horticulturalist to their staff. This new position will serve to implement and facilitate conservation activities involving the living plant collections at the Garden. We see a significant and exciting interaction between these activities at

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W.

John
Kress



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Staff Research

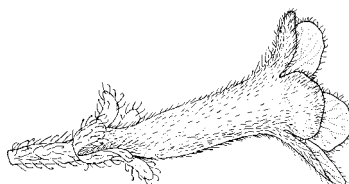
Mark Littler, Diane Littler, Barrett Brooks, Jennifer Han (NMNH dive officer) and Connie Gasque (volunteer) just returned from a two-week collecting expedition aboard the NSF-UNOLS ship R/V Urraca (*below*). The team collected over 800 numbered wet specimens during 100 SCUBA dives (including an additional 175 molecular specimens and many bulk collections for herbarium mounts). The cruise started at Bocas del Toro (close to the Caribbean border with Costa Rica) and worked eastward to Escudo de Veraguas (known as the Galapagos of Panama) and ended at Colon, the eastern entrance to the Panama Canal. Escudo de Veraguas had an unusually rich algal flora unique to the Caribbean (only at Diamond Rock in Martinique have the Littlers ever encountered such a diverse community). The area proved to be exceptionally rich in Rhodophyta (red algae), Chlorophyta (green algae) and Cyanobacteria (blue-green algae). The captain and crew of the ship were extremely helpful as were all the support staff at the Smithsonian Tropical Research Institute (STRI), which made the expedition so successful (the Littlers had estimated that the collection would not exceed 500 numbers).



On 14 September **Dan Nicolson** visited the New York Botanical Garden to continue his work on *Taxonomic Literature* ed. 2 (TL-2), Supplement 7 (F-G). He returned six TL-2 file boxes previously borrowed. During his 2.5 days he processed three additional boxes, returning to Washington with six more borrowed boxes to work on. During Hurricane Isabel he continued to work at home, processing two more boxes

and is now dealing with authors beginning with Frey- (i.e., about 37 percent through the first draft).

Paul Peterson traveled to northern Mexico (18 August to 24 September) to collect grasses and a few other interesting plants along the way. A pack trip to the Barranca del Cobre in western Chihuahua was undertaken to study the plants and animals in the Sierra Tarahumara. Four Tarahumara Indians (Martin Gonzalez-Diaz, Elvira Gonzalez-Ayala, Tranquilino Gonzales, and Eliseo Gonzales-Morales) and four scientists (Peterson, Pilar Catalan, Gabriel Villagas Guzman, and Celia Lopez-Gonzalez) spent 10 days traveling within four barrancas (Baqueachi, Corarechi, Basihuare, and Osichi). Three burros were used to transport provisions, presses, tents, and traps. Many plants (approximately 200 numbers), bats, rodents, spiders, scorpions, and lizards were gathered from this remote area. Grasses from Durango and Nuevo Leon were also collected with help from Georgina Tena-Gonzalez, Socorro Gonzalez-Elizondo, Francisco Sanchez-Alvarado, Jesus Valdes-Reyna, George S. Hinton, and Rafael H. Cardenas. A total of 339 numbers of plants were collected on the entire trip.



Staff Activities

Stanwyn Shetler gave his annual lecture on "Local Biodiversity Issues," 15 September, to the Johns Hopkins University graduate course on "Biodiversity and Wildlife Management," initially organized by Tom Lovejoy. He is again teaching a two-credit, eight-week course (17 September to 5 November) on "Fall Woody Plant Identification" in the Graduate School, USDA. On 5 October, he was a member of a small panel discussing the future of native plant societies at the Tri-state Native Plant Society Fall Conference (Maryland, Virginia, West Virginia) at the U.S. Fish and Wildlife National Conservation Training Center in Shepherdstown, West Virginia.

Laurence E. Skog was inducted into the Academy of Science and Engineering at the University of Minnesota, Duluth on 26 September.

Alice Tangerini attended the Annual National Meeting of the Guild of Natural Science Illustrators (GNSI) from 27 July through 2 August. The meeting was held at the University of Denver in Denver, Colorado and included field trips to nearby Denver Botanic Gardens (DBG) and to Mt. Goliath Alpine Reserve, about 70 miles from Denver. The DBG was beautifully designed by landscape architects who chose theme formats relating to climates (e.g., desert, alpine), geographical areas (i.e., Japan, Midwestern United States), and artistic themes (i.e., "The Monet Garden"). Workshops and slide lectures focused on techniques in the digital programs Adobe Photoshop and Adobe Illustrator. A lecture on conservation methods for matting and framing museum pieces was particularly timely considering the recent acquisitions of artworks to the Botanical Art Collection. Tangerini had two of her ink drawings, *Festuca towarensis* (Poaceae) and *Aristeguieta glutinosa* (Asteraceae) on display at the GNSI Annual Exhibit at the Denver Museum of Nature and Science.

Liz Zimmer attended a workshop of the Undergraduate Mentoring in Environmental Biology (UMEB) program at the National Science Foundation on 25 September. As co-principal investigator of a grant for undergraduate attendance at national meetings (with Scott Edwards, principal investigator), she represented the Society of Systematic Biologists and the Society for the Study of Evolution.

Awards & Grants

John Kress, along with collaborators Peter Belhumeur, Steven K. Feiner, and Ravi Ramamoorthi from Columbia University, and David Jacobs from the University of Maryland, were awarded a five-year grant from the National Science Foundation (NSF) for their research into the production of the first generation of electronic field guides. Their grant, entitled "An Electronic Field Guide: Plant Explora-

tion and Discovery in the 21st Century,” has the aim to produce computing devices that enable a taxonomist in the field to remotely access critical information on plant species, which will dramatically reduce the time needed to identify and describe new species.

The field guide will allow for visual and textual search through a newly created digital collection of the 95,000 botanical type specimens in the US National Herbarium. The proposed digital collection will include images and three-dimensional models of the type specimens, non-type specimens, and live plants. Using this device, a taxonomist in the field will be able to digitally photograph a plant and determine immediately if the plant is present in the collections in the herbarium or new to science. For plants that are known, the device will provide a means to ascertain what data currently exist about this taxon. The electronic field guide will be built by harnessing the combined power of remote sensing, computer vision, computer graphics modeling, visual databases, mobile user interfaces, and wireless data transmission.

The electronic field guide will enable scientists in the field to quickly access current knowledge about the described species on Earth in order to identify and inventory the remaining undescribed flora, much of which may be of benefit to society. Success in this domain could serve as a model for similar devices/instruments in other areas of the sciences, commerce, and education. As a secondary goal, this project will make these resources available to students, amateur botanists, and the general public. To accomplish this, a simplified user interface to the electronic field guide will be developed.

The first pilot project will focus on the flora of Plummers Island, a small reserve on the Potomac River owned by the National Park Service, but maintained by the Washington Biologists' Field Club since 1908. The site of numerous investigations by Washington area biologists over the last 100 years and the 400+ species of plants, which are all documented by specimens at the US National Herbarium, the island will serve as a test site to develop the first prototype of the electronic field guide.

Botany Greenhouses Visited by Elite Group

On 2 June, the Botany Greenhouses in Suitland, Maryland, were visited by the wives of three ambassadors of countries from Southeast Asia. Daw Thi Thi Ta, the wife of Ambassador Linn Myaing of Myanmar, was invited to take a tour of the greenhouses after she expressed interest in the spring during a reception for the release of “A Checklist of the Trees, Shrubs, Herbs, and Climbers of Myanmar” by **W. John Kress, Robert DeFilipps, Ellen Farr** and Daw Yin Yin Kyi (2003, *Contributions from the United States National Herbarium* 45: 1-590). Daw Thi Thi Ta was joined by her daughter, Amara Thiri Myaing, Datin Faridah Ghazzali, the wife of the Ambassador of Malaysia, and Amphanh Phommahaxay, the wife of the Ambassador of Laos. The early summer months were a perfect time for a visit as many dormant ginger plants were in full bloom.

Michael Bordelon, Greenhouse Manager, led the tour, and was joined by John Kress, **Ida Lopez**, and Museum Director **Christián Samper**. The entire live

collection of plants was shown, with a high interest in Southeast Asian plants, especially gingers. Medicinal and culinary uses of ginger were exchanged among the guests. Much was learned as Southeast Asian recipes use different parts of the ginger plant, besides the rhizome. For instance, in Malaysia, not only is the rhizome ground into a powder, but the leaves are used while boiling meat, which brings about a very distinct taste.

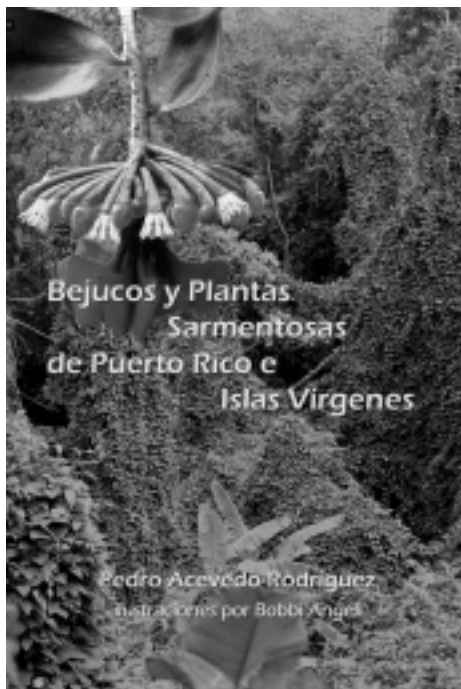
The event was such a success that Daw Thi Thi Ta returned for a follow-up tour on 24 July to see additional flowering plants. A third visit is scheduled for October.



Visiting the Botany Greenhouses are, from left, Christián Samper, Datin Faridah Ghazzali, Ida Lopez, Daw Thi Thi Ta, Amphanh Phommahaxay, Amara Thiri Myaing, and John Kress. (Photo by Michael Bordelon)

Book on Puerto Rican Vines and Climbing Plants Published

The book "Bejucos y Plantas Trepadoras de Puerto Rico e Islas Vírgenes" (Vines and Climbing Plants of Puerto Rico and the Virgin Islands) by **Pedro Acevedo** has recently been published (October 2003). This book constitutes an illustrated field guide to the native, naturalized or commonly cultivated vines and lianas of Puerto Rico and the Virgin Islands. It includes taxonomic revisions, discussions on the distribution and conservation status, as well as full descriptions and illustrations for the species. A total of 386 species distributed in 65 families and 187 genera are treated. Of these, 274 are native, 34 are endemic, 64 have been naturalized and approximately 49 are commonly cultivated in gardens. For purchasing a copy please contact Acevedo by E-mail at acevedo.pedro@nsmnh.si.edu.

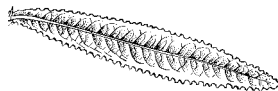


Discovery of Lost Gesneriads

John Boggan recently discovered some "lost" gesneriad type specimens. According to Atkins and Cronk (2001). The genus *Cyrtandra* [Gesneriaceae] in Palawan, Philippines. *Edinburgh Journal of Botany* 58: 443-458), the species *Cyrtandra*

hypochrysoides Kränzlin is known only from the original description. The article states, "No specimens of this species have been seen.... It is likely that the top set of Kränzlin's original collection was kept at the National Herbarium in Manila and would have been destroyed in the Second World War. Kränzlin's own herbarium, which contained most of his type specimens, was acquired by Berlin and would also have been destroyed in the War. Other duplicates may have been distributed elsewhere but have not been traced."

Boggan was curious about this situation, and checked for the species in the US National Herbarium, where he discovered duplicates of all three syntypes of *C. hypochrysoides* (Foxworthy, Bur. Sci. 650, 687, 2543). He also found that US has two duplicates of each collection, with one duplicate of Foxworthy 650 annotated as "Typus! Kränzlin! 1912" (presumably in Kränzlin's own hand), which would probably be a good candidate for a lectotype.



The Library of Congress Displays Specimens from the US National Herbarium

Six specimens from the U.S. National Herbarium are displayed in a new exhibition at the Library of Congress. "Rivers, Edens, Empires: Lewis & Clark and the Revealing of America" presents a century of western exploration, beginning in 1776 and ending with the building of the transcontinental railroad in the mid-nineteenth century. The herbarium specimens have been chosen to represent three major events: the U.S. Exploring Expedition under the Command of Captain Charles Wilkes, Fremont's expedition to California, and the Mexican Boundary Survey. Another highlight of the exhibit is the display of the large 1507 world map by cartographer Martin Waldseemüller, which gave the name "America" to the new lands explored by Columbus and Vespucci. "Rivers, Edens, Empires" is currently on display through 29 November in the Thomas Jefferson Building.

Research at Siempre Verde

Robert A. Braddy, head of the Upper School Science Department at the Lovett School in Atlanta, Georgia, and director of Siempre Verde, invites all interested scientists to consider visiting the research facility at the Siempre Verde Andean cloud forest in Ecuador. Detailed information on the 520-acre portion of cloud forest, which is in one of the top 10 hotspots for conservation concern in the world, is available at <http://www.siempreverde.org>. Braddy can be contacted by E-mail at bbraddy@lovet.org.



Turning Japanese

"A New Century of Biology" (2001, Smithsonian Institution Press), edited by **W. John Kress** and Gary W. Barrett, has recently been translated into Japanese. The eleven essays contained in the volume, contributed by Ernst Mayr, Gene Likens, Gordon Orians, Marvalee Wake, Lynn Margulis, Dan Janzen, Tom Lovejoy, Ian Prance, Edward Wilson as well as Barrett and Kress, consider how our discipline must evolve to address the problems of the twenty-first century. Published in Japan by Tsukiji-shokan Publishing Co., Ltd., Yuri Oiwa has translated the entire text, tables, and figures into Japanese. The book is available at <http://www.tsukiji-shokan.co.jp>.

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the USBG and our own conservation initiatives in Botany, including public education and international capacity building.

All of these tasks directly address the objectives and targets set forth by the Global Strategy for Plant Conservation. The Department of Botany at the Smithsonian Institution accepts the responsibility to play an active part in achieving these goals by the year 2010. The Plant Conservation Unit is the center of these endeavors in Botany and in order to facilitate these activities we hope to enlarge and strengthen the PCU with additional staff and resources in the near future.

The 2004 Smithsonian Botanical Symposium, 6-8 May, to Evaluate Botanical Progress, Horticultural Innovations, and Cultural Changes

How did major developments in botany and horticulture impact gardens, gardening, landscaping, agriculture, and science? How did these disciplines depend upon ongoing social and cultural changes? And, more importantly, how did botany and horticulture contribute to larger changes in social and cultural practices?

In order to frame interrogations about the potential impact of present botanical and horticultural changes brought about by molecular biology, presentations at the 2004 Smithsonian Botanical Symposium will offer broad perspectives, relating large botanical and horticultural changes to the cultural, social, economic, and political context.

The Symposium, entitled “**Botanical Progress, Horticultural Innovations, and Cultural Changes**” will document major changes in plant introductions, techniques of domestication and cultivation, breeding practices, and naturalization of exotics, as they relate to important changes in society, and to far-reaching cultural transformations. The Symposium, to be held 6-8 May 2004, will be held for the first time in conjunction with Dumbarton Oaks and the United States Botanic Garden.

During the first two days at Dumbarton Oaks, the Symposium will include a synthetic analysis of a small number of situations taken in the most varied historical and geographical contexts, such as Ancient Egypt, Andalusia, China, England, France, India, Japan, the Mediterranean region, Persia, Turkey, the US, and Yemen, and proceed to the present. Also examined will be contributions of botanical and horticultural changes to very different domains of culture and social practice, such as medicine, religious practices, eating habits, taste for exoticism, production and use of perfumes, conspicuous consumption, and social distinction.

These scientific and horticultural innovations are embedded in political and economic changes to which they contribute. Policies that were proposed or attempted by different political regimes in an effort to harness horticultural and botanical change in the pursuit of specified aims will be addressed. In short, the

social and political conditions will be explored under which horticulture and botany gave added cultural significance to nature.

The final session, to be held on the third day at the Smithsonian Institution, will examine contemporary botany and horticulture in a changing world.

Intellectual property rights, globalization, global warming, and the problem of

invasive species are all current topics that will be investigated in detail. The keynote address will be presented after the symposium dinner and musical entertainment.

The fourth José Cuatrecasas Medal in Tropical Botany will be awarded at the 2004 Smithsonian Botanical 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

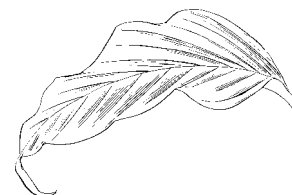
pioneering botanist who spent many years working in the Department of Botany at the Smithsonian and devoted his career to plant exploration in tropical South America.

In addition, the International Association for Plant Taxonomy (IAPT) is proud to announce that the first Stafleu Medal will be presented at the 2004 Symposium.

The award is for a publication of outstanding work on nomenclatural,

historical, or bibliographical aspect of plant systematics.

For more information about the 2004 Smithsonian Botanical Symposium, visit <http://persoon.si.edu/sbs/> or call 202-357-2534. In addition, registration will soon be available at this Web site.



Celebrating Linnaeus' *Species Plantarum* 250th Anniversary

Dan Nicolson and Warren Wagner attended the 250th anniversary of Linnaeus' *Species Plantarum* (1753) in Uppsala, Sweden which involved three days of talks and events (22-24 August). Prior to the celebration the International Association for Plant Taxonomy (IAPT) Council met, including Nicolson as immediate Past President and Wagner as Administrator of Finances (upon resignation of Peter Stevens in 2001). There is a good chance that there will be a new constitution and bylaws. Two new medals were announced (a Stafleu Medal and a Stebbins Medal). At the Symposium Dinner, Scott Mori was awarded the Engler Medal in Silver for his work on the Flora of Central French Guiana.

The first day of the program focused on the historical aspects of the *Species Plantarum*, including Charlie Jarvis talking

on Linnaean names and their types, with visits to the Botanical Garden and a Symposium dinner. The second day was in two parts: a discussion of the Future of Biological Nomenclature (including Kevin deQueiroz) and the pros and cons: In the middle was a trip to Linnaeus's Hammarby which revealed unexpected things like Linnaeus' study being "wallpapered" with illustrations from Plumier's *Plantarum Americanarum* (1755-1760). The third day was on Inventorying the Flora of the World. Nicolson was familiar with most of the botanists and subject matter so he went through the Herbarium's reprint collection for *TL-2* Supplement work. The last event was a visit to Linnaeus' garden and museum where Nicolson and Wagner saw an amazing amount of original furniture, equipment, and clothes.

USBG Titan Arum Inflorescence Now in the US National Herbarium

On July 23, *Amorphophallus titanum*, commonly known as the Titan arum or the corpse flower, bloomed with a 4-foot tall inflorescence at the United States Botanic Garden (USBG). This species produces the largest unbranched flowering inflorescence in the world.

A native to the rainforest of Sumatra, it typically grows in the moist shaded soils on the forest floor. On 25 July, as the inflorescence approached its final days before collapse, **Dan Nicolson** collected and prepared herbarium material by dissecting the inflorescence. USBG donated the inflorescence to the United States National Herbarium, which will preserve its value far into the future.

USBG arranged for a group of educators from the American Horticultural Society, who had convened the 2003 National Youth Gardening Symposium in Alexandria, Virginia, to hear Nicolson narrate the dissection. This proved to be a once-in-a-lifetime opportunity to hear a specialist in

the aroid family talk about the Titan arum and see him at work.

Nicolson, with **Deborah Bell**, first removed the spathe, measuring about 30-inches at its widest point. It was divided into half—one half to be pickled, and the other half for drying in a plant press. Anna Weitzman wrote notes in Nicolson's collection book. Nicolson then chopped off the spadix, laid it on the table, split it in half, and invited the audience to come and take a close look at the long-styled female flowers (about one-inch long) and the strings of pollen from the male flowers.

Half the spadix was used for specimens (including jars of pickled material and pollen samples for freezing). The other half

of the inflorescence was put into a plastic bag and now is in a tank normally used for preserving reptiles.

Although the above ground part of the plant is gone, below ground the corm is alive and well. In its current dormant state,



Amorphophallus titanum in flower. (Photo by Ida Lopez)



Bell (left) assists Nicolson, as he lifts off the spathe to exhibit the central spadix bearing the male and female flowers. (Photo by Anne-Catherine Fallen)

it will live at the USBG Production Facility greenhouses. Eventually, it will send up leaf stalks that will produce food until enough energy is stored for another bloom. This could take several years.

Additional photos of the proceedings are up at the Botany Web site <<http://persoon.si.edu/amorphophallus/>>.



Recent Additions to the Botany Art Collection

The Botany Art Collection received three new recent acquisitions. Two pieces were gifts of artists who were featured in the "Passion for Plants, the Shirley Sherwood Collection," Leslie Berge and Francesca Anderson. Berge, a freelance artist from Rhode Island, donated with the help of Shirley Sherwood a watercolor of *Zingiber zerumbet*, a study of three inflorescences showing the color variation in pastel shades ranging from soft rose to lemon yellow. After hearing of the Berge gift, Anderson, of Brooklyn, New York, gave Botany a pen and ink of the inflores-

cence of the torch ginger. Each indicated in letters with the paintings that they were extremely pleased with the "Passion for Plants" exhibit and this was their way of saying thanks.

The third piece, a watercolor by Lester Pancoast, was a gift whose subject was based on a photograph by **Deborah Bell** which appeared in *The Plant Press*, Vol. 5(2), April-June, 2002. Bell took the picture of *Dicranolepis* in Gabon during her field trip there in 2002. Pancoast, an accomplished artist from Florida, only saw the black and white version and made up his

own color scheme for the plant which turned out to be surprisingly realistic.



A Trip to Mongolia

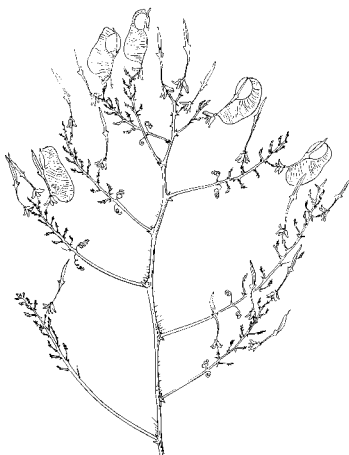
By Gregory McKee

On 10 August, **Paula DePriest** and **Gregory McKee** departed for a month long trip to Mongolia. The purpose of the trip was to visit the mountains on the west side of the Mongolian province of Hovsgol Aimag and document the location and vegetation of the various seasonal pastures used by the reindeer-herding Tsataan people. DePriest and McKee traveled with Steve Young, a paleo-ecologist from Sterling College, Vermont. After flying from the capitol of Mongolia, Ulaan Bataar, they were met by their Mongolian colleagues in Muron: Sukh-bataar of Chinggis Khan University; Oyumaa, a botanist; Oyumbilig, a student of Oyumaa; Dembril, a lichenology student; and Naraan, an anthropologist (Mongolians generally use one name only). The interpreter during the trip was Adiya.

Traveling by jeep and van, the group first visited a large freshwater lake in Northern Mongolia which gives the province its name: Hovsgol. There are 96 rivers flowing in, and only one flowing out. After collecting specimens on the western edge of the lake, the group crossed the Darkhat valley to get to the mountains where the Tsataan live. Semi-collapsed and rickety bridges foreshadowed the trouble they would have returning after heavy rains fell, washing the aforementioned bridges away. The rains caused trouble for travel, but made the collecting of plants wonderful. Oyumaa found species that had stayed in flower longer than usual because of the abundant moisture, so the vascular collecting was better than expected. Gentianaceae were particularly abundant. On the lichenology front, DePriest collected enough specimens to literally fill a duffel bag.

Once the group got to the base of the mountains, the rains began to fall in earnest. The mode of travel in those parts is by horse, or for those who are svelte (less than 150 pounds) by reindeer. McKee fell off his horse once because he was not paying attention. The other three times, the horses fell under him while crossing rivers or slipping on boulders, which may demonstrate how rugged the country was. Rugged as it was, Northern Mongolia is breathtakingly beautiful in the late autumn (August). The tundra was dominated by

low-growing *Betula* species which had turned red, and grasses which were golden yellow. The hillsides tended to be boggy larch forests with some Siberian pines, a source of pine nuts for the Tsataan. All of this was underlain by abundant lichens, the primary pasturage for the reindeer, with *Cladonia stellata* being the favorite, along with bolete mushrooms in the forests. DePriest and McKee were able to get data on two autumn pastures and a spring pasture, but early snow forced them to leave the mountains before they could visit the summer pastures. Since this is a continuing project, DePriest intends to return next year, perhaps in June.



Acevedo Explores the Caribbean and Brazil

This past summer, **Pedro Acevedo** spent six weeks (15 May to 30 June) carrying out field work in the Dominican Republic. This is the first of a series of scheduled trips to take place during the next three years, aimed at documenting the biota of the montane habitats on the island of Hispaniola (Haiti-Dominican Republic). The project "Understanding Vanishing Endemism: Survey of the Invertebrates and Plants of Threatened Montane Habitats in Hispaniola" is fully funded by the Biodiversity Surveys and Inventories Program (BSI) of the National Science Foundation and is a joint effort between Carnegie Institute (CMNH), Harvard University (MCZ) and the Smithsonian Institution in collaboration with the Jardín Botánico Nacional de Santo Domingo (JBSD), the Museo Nacional de Historia Natural de Santo Domingo (MNHNSD), the Ministère de L'Environnement Nationale of Haiti

(MEH), and the State University of Haiti (SUH). Key players on this enterprise are John E. Rawlins, Chen W. Young, and Robert L. Davidson from CMNH, Brian D. Farrell from MCZ, Ricardo García from JBSD, Carmelo Nuñez from MNHNSD, Joseph R. Toussaint from MEH, Jean A. Constant from SUH, and Acevedo.

The goal of the Hispaniola project is to document the diversity of invertebrates especially of insects, and all vascular plants present in the last remaining patches of natural vegetation on the island of Hispaniola. During the first trip the team conducted extensive work in the Cordillera Central (Valle Nuevo, Ebano Verde, La Nevera, and El Convento), Sierra de Bahoruco (Hoyo de Pelempito), and Sierra de Neiba (Sabana del Silencio, and along the border with Haiti). A very productive trip accounted for nearly a thousand botanical collections plus tens of thousands of insect collections. The next trip is scheduled to take place in Haiti sometime during late winter in early 2004.

During the second half of the summer (1 July to 15 August), Acevedo resumed his field work on the karst limestone vegetation of Puerto Rico in order to increase the floristic knowledge of this region. The collections made there during this trip have been analyzed and currently incorporated into a final checklist of the vascular plants.

From mid-September to the beginning of October, Acevedo traveled to Brazil to conduct fieldwork in the western Amazonian state of Acre. He joined a team of botanists from the New York Botanical Garden (Douglas C. Daly and John Mitchell) and the Universidad Federal do Acre (Evandro Ferreira, Marcos Silveira, and students). Although the trip occurred during the end of the dry season, they were able to make numerous collections, especially of Sapindaceae (*Paullinia*, *Serjania*, *Talisia*, *Toulicia* and *Pseudima*) and numerous vine families. The trip began in the town of Rio Branco, and from there they traveled southwest to the Municipio of Brasileia on the border with Bolivia, then east to the Municipio of Capichaba, and finally to the Municipio of Acrelandia in the easternmost part of the state. The trip provided Acevedo the opportunity to learn about the vegetation and flora of this extensive flattened terrain in the western Amazon region.

Kress

Continued from page 1

alliances and changes. While involved largely with gingers and heliconias, Kress has also produced a significant body of work on orchids, bromeliads and other epiphytes. A total of 240 plant species named or co-named by him are listed in *Index Kewensis 2*, to which should be added several recently published Myanmar Acanthaceae.

Kress observes that due to our position as a federal (national) museum, including the US National Herbarium and botanical department, the Smithsonian responsibilities to leadership, service and research are necessarily of a larger scale, more encompassing than most organizations and universities. As a national entity, we have, he says, a responsibility to conserve the environment as well as understand it. A rigorously applied global dimension, or implied application, is often evident in the scientific work of the department, because there are such enormous resources and systematic collections of organisms at its disposal. And that is what motivates curators to shoulder large, often seemingly overwhelming, projects such as those of V. Funk in the Guianas, P. Acevedo in the Caribbean and Brazil, L. Dorr in Venezuelan national parks, W. Wagner in Hawaii, the Marquesas and other Pacific areas, R. Faden in east and west Africa, and P. DePriest in Outer Mongolia.

As chairman, Kress reformulated a plan for collections management, formulated a thoughtful method for allocating federal resources based on productivity, established the Botanical Exploration Fund to increase resources for field work, and initiated a successful series of annual Smithsonian Botanical Symposia. The first three symposia covered overarching themes of nomenclature and cladistics; scientific issues surrounding the Convention on Biological Diversity; and progress in Southeast Asian botany, respectively. These have generated feedback that resonates in the form of numerous articles in *Taxon*, critical assessments of concepts in follow-up workshops and meetings, and international stimulation of research. We look forward to the fourth symposium, to be held in May 2004, on "Botanical Progress, Horticultural Innovation and Cultural Changes," in conjunction with the

US Botanical Garden and Dumbarton Oaks. Again the scope of the symposium will be broad: how societal and cultural changes have affected the sciences of botany and horticulture, from ancient Egypt to the 21st century.

As chair of Botany, Kress was recently instrumental in developing a protocol of cooperation, a memorandum of mutually beneficial understanding, between the National Museum of Natural History and the U.S. Botanical Garden in Washington, D.C. The memorandum is vibrantly facilitating jointly sponsored exhibits, educational planning, public display projects, and programs such as the annual botanical symposia, which have venues at either or both of the large facilities. Smithsonian botany staff often lectures to the public in the newly refurbished Garden.

A program of botanical exploration in the tropical Southeast Asian nation of Myanmar (known until recently as Burma) was initiated by Kress several years ago, and he has traveled there, principally to under-explored areas, many times with botany staff specialists to collect for the herbarium as well as bring back living specimens, the latter destined for the Smithsonian Botany Research Greenhouse. "Botanical Exploration in Myanmar" is a long-term collaborative effort involving persons from the US National Herbarium, the Forest Department of Myanmar, and the University of Yangon. Its progress has been followed with interest by His Excellency the Ambassador of Myanmar, and his wife who has botanical training. Kress initiated a database of information on Burma plants (which is continually receiving new information), while the US and Burma herbaria were inventoried for relevant specimens, and Washington has been visited several times by Myanmar colleagues. These endeavors, plus a great deal of information sharing by Smithsonian and international botanists, resulted in preparation of a checklist that updates four previous editions going back to 1912. Information on the project may be sought on the Botany Website, and the checklist, which covers gymnosperms and angiosperms, introduced as well as indigenous taxa, was published as: Kress, W.J., DeFilipps, R.A., Farr, E. and Daw Yin Yin Kyi. 2003. A Checklist of the Trees, Shrubs, Herbs, and Climbers of Myanmar. *Contrib. US*

National Herbarium 45: 1-590.

Kress, either alone or with collaborators, has published floristic treatments of the Heliconiaceae of Hawaii and Nicaragua; Cannaceae and Heliconiaceae for the Flora of North America; the Musaceae, Lowiaceae and Cannaceae for the Flora of China; and recently prepared Heliconiaceae for a Manual of the Plants of Costa Rica. However, on a number of occasions, the research of Kress and co-workers has resulted in surges of unusual public interest, in addition to attention from the scientific community.

For example, his recent series of field trips in Myanmar (Burma) inspired a write-up in *Sports Illustrated* featuring modern-day explorers ("SI Adventure," 99(9): A26. 8 September 2003). It mentions that in Burma, Kress was trekking in forests inhabited by tigers, "lost a colleague to the bite of a poisonous snake, and... spent a harrowing night after mistakenly eating a leaf from a poisonous, hallucinogenic plant" (well, he *is* a vegetarian). Over the years he has conducted field work in 35 tropical and subtropical countries, sometimes for stretches of two to 12 months at a time. His manifesto is clear (*loc. cit.*): "I do this to know how natural ecosystems work... My job is to discover the natural world – or what's left of it."

Every botanist, horticulturist and gardener interested in tropical plants has heard of the stately and alluringly colorful genus *Heliconia*, the subject of a book by Fred Berry (deceased) and Kress entitled "*Heliconia: An Identification Guide*." The "Average Customer Review" at Amazon.com mega-booksellers gives it a 5-star rating, and it is ranked among the 50 most popular books about plants, right up there with tomes on the opium poppy and marijuana, but also in company with titles including "*The New Oxford Book of Food Plants*," "*The Besler Florilegium*," and David Attenborough's "*The Private Life of Plants: A Natural History of Plant Behaviour*." In fact, one reflection of the recent increase in the ecotourism industry is that the *Heliconia* book, now in its fifth printing and easily slipped into well-stuffed backpacks, is widely disseminated all over Latin America, the natural geographical range of heliconias.

National press coverage has also been accorded to research that Kress has performed, for example, on the gender-

bending flowers of *Alpinia* (Zingiberaceae) that switch from male to female or vice-versa in unison at mid-day to avoid self-pollination; and on the discovery of the new genus *Smithatris* (Zingiberaceae), published with Kai Larsen (Denmark), a plant first seen in a Singapore flower market and then traced to the wild limestone hills near Bangkok, Thailand, truly an instance of "horticulture informing botany": its botanical affiliations were confirmed by DNA analysis, and a second new species for the genus was later encountered near Mandalay, Burma.

A recent study of co-adaptation has found widespread appeal among scientists and the public alike (evidenced by the volume of press reports), and was highlighted on the cover of *Science* for 25 April 2003. It involves the intricate evolutionary partnership of *Heliconia* species and birds, resulting from a combination of the plants' altitudinal preferences and juxtaposed inter-insular geographical ranges, inflorescence-color morphs and differing flower shapes (bearing on their role as nectar-food plants), when placed into a functional context of the differences and polymorphisms in bill length and curvature, sexes and body sizes of the sole pollinator, the Caribbean purple-throated carib hummingbird.

This phenomenon was studied as a team by ornithologist Ethan Temeles and Kress in the Lesser Antillean islands of St. Lucia and Dominica. Kress notes that these Caribbean islands are a comparatively simpler laboratory in which to study such co-adaptations, compared to the complex mainland systems, which can be exemplified by field sites in Costa Rica with 10 sympatric species of *Heliconia* and 15 species of hummingbird. So the Neotropical mainland and Caribbean islands will continue to be a repository of evolutionary phenomena awaiting future research.

Among the next projects that Kress has under preparation are: Heliconiaceae for Flora Mesoamericana; research for a book on the gingers of Myanmar (Burma); publication of a book with Krupnick and Smithsonian contributors demonstrating a natural history approach to plant conservation; molecular studies to unravel problems of delimitation at the species level among Zingiberales, needed as precursors to continuing adaptive radiation studies; and the provision of informa-

tion, in conjunction with Chinese scientist Aizhong Liu, for the study of a genome map of the banana (*Musa*) recently discussed in collaboration with the Institute for Genomic Research, a study likely to have potential for future plant breeding purposes.

In addition to those endeavors, he is working on a book about tropical pollination and frugivory, with bat specialist Ted Fleming, which will probe the influences of vertebrate pollinators and seed dispersers; and, he is planning the production of an electronic field guide to neotropical plants that will permit field workers to identify species by means of comparing digital photo images of a wide assortment of databased type specimens, with the digital image of a plant being generated far away during field work, and accessed by means of a palm pilot-like satellite communication device (see "Awards and Grants" in this issue).

Fossil bananas of the genus *Ensete* have been found in Oregon (Manchester & Kress, *Amer. J. Bot.* 80: 1264-1272. 1993), mute evidence that the complicated but fascinating potentials for exploring the natural history of Zingiberales are literally endless, and will most likely be studied by Kress far into the foreseeable future.



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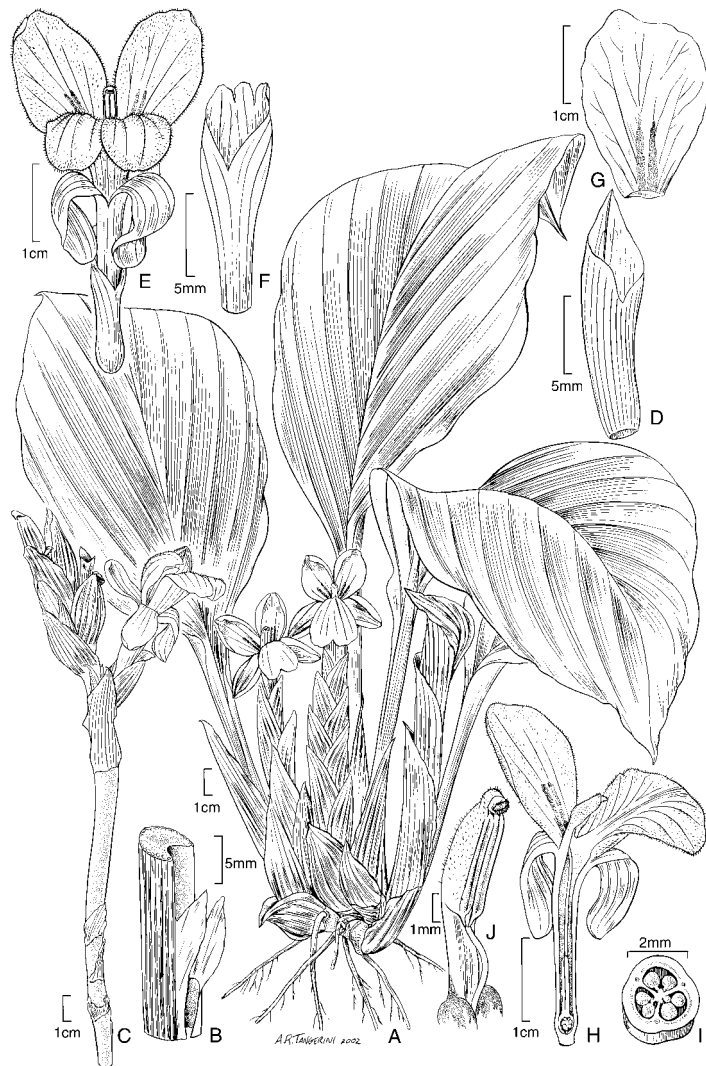
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Art by Alice Tangerini

***Distichochlamys rubreostriata* W.J. Kress & Rehse**

Distichochlamys rubreostriata W.J. Kress & Rehse, a recently described species of the Zingiberaceae, was first collected in Vietnam by Henk van der Werff of the Missouri Botanical Garden. Kress saw it in cultivation in the Climatron in St. Louis on a visit several years ago. He immediately recognized it as distinct from the other two species of the genus. Tanya Rehse, a graduate student at Duke University, made the critical comparisons that clearly demonstrated that it was a distinctive new species, and together with Kress published it in a recent volume of *Brittonia*.



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