Department of Botany & the U.S. National Herbarium

The Plant Press

Smithsonian
National Museum of Natural History

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Special Symposium Issue - see page 10

Botany Profile

Botanists Look Into the Future

By Gary A. Krupnick

Imagine trekking into an unexplored tropical forest, equipped with a palmtop computer, wearable imaging goggles, a global positioning system receiver, and a web-based satellite communication device. After coming across an unidentifiable plant, you take a picture of a leaf, and your portable computer compares it to an electronic database of leaf images from the world's tropical plant species. You then immediately compare your newly collected plant with the type specimen and reference collections archived and digitized in museums thousands of miles away. You also place a small leaf sample in your hand-held DNA barcoder to read the genotype of the species. The information you gather is sent with the speed of the Internet to your colleagues back in the lab where the genetic composition and phylogenetic position of each new species is rapidly determined.

Science or science fiction? On 15-16 April, a group of 160 enthusiastic scientists gathered at the National Museum of Natural History, to discuss these technological possibilities at the fifth annual Smithsonian Botanical Symposium, "The Future of Floras: New Frameworks, New Technologies, New Uses." Seven invited speakers explored the past, present, and future uses of floras and checklists; development of on-line keys; innovations in digital image recognition; production of electronic field guides; and the prospects of plant DNA barcoding. Keynote speaker Rita Colwell addressed how the application of biodiversity knowledge can benefit humankind in innovative and practical ways.

The symposium got off to an exciting start on the evening of 15 April, with an opening reception at the United States Botanic Garden, a symposium co-sponsor. An enthusiastic crowd gathered in the atrium for food and conversation surrounded by a fragrant and flourishing collection of plants. During the reception, guests were able to view the latest Garden exhibit featuring plant species that were collected during the U.S. Exploring Expedition (1838-1842).

Smithsonian Botanical Symposium

W. John Kress, symposium convener, welcomed the audience at the morning session on 16 April. Kress explained that the theme of the symposium grew out of a project of the Department. Type specimens at many herbaria, including New York, Missouri, Harvard, and the US, have been recently digitized, making them available to botanists around the world. What if these digitized specimens can be used in conjunction with imaging software to create an electronic field guide? Ideas around this question and others helped create the theme of the symposium.

The morning session began with the presentation of the fifth José Cuatrecasas Medal for Excellence in Tropical Botany, which was jointly awarded to Drs. Jerzy Rzedowski and Graciela Calderón de Rzedowski of the Instituto de Ecología del Bajío in Michoacán, Mexico. Though the Rzedowskis were unable to attend, the award was accepted on their behalf by Victoria Sosa from the Instituto de Ecología in Xalapa. According to Sosa, the Rzedowskis feel that a "fundamental priority" for botanists everywhere is the completion of a flora of the world. The Rzedowskis were recognized for writing an impressive catalog of the flora of one of the world's largest metropolitan areas (see related article, page 10).

The first invited speaker was Vicki Funk, Senior Scientist at the Smithsonian Institution, who spoke on "Floras: A Model for Biodiversity Studies or a Thing of the Past?" Floras, which include everything from checklists to monographs, function by answering the questions of how many plant species, where do they grow, and how are they related. Floras are now becoming useful in asking new questions about the patterns of global diversity (e.g., importance of taxa as surrogates, endemicity levels, conservation needs). Funk explained that we can learn new ways of using floras by looking at past examples. For example, the floras generated by Joseph Hooker's Antarctic voyage (1839-1843) resulted in "bands of affinity" when the tables of species were compiled and compared; and Carl Eigenman's 1809 monograph on Patagonian fish discovered a connection between African and South American fauna.

Funk continued by stating that checklists are making a comeback in answer-

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Visitors

Richard Olmstead, University of Washington; Lamiales (10/19-4/20).

Barry E. Hammel, Missouri Botanical Garden; Mesoamerican Clusiaceae (4/1-4/4).

Isabel Perez, Missouri Botanical Garden; Mesoamerican Clusiaceae (4/1-4/4).

Wesley Knapp, Maryland Natural Heritage Program; *Juncus longii* (Juncaceae) (4/11).

Claire Martin, New York Botanical Garden and the National Natural History Museum, Paris; Melastomataceae (4/11-4/15).

Fabian Michelangeli, New York Botanical Garden; Melastomataceae (4/11-4/18).

Mark Watson, Royal Botanic Garden Edinburgh; Flora of Nepal, Flora of China (4/12-4/17).

Gustavo Romero, Oakes Ames Orchid Herbarium, Harvard University Herbaria; Neotropical Orchidaceae (4/13-4/15).

Julie Barcelona, Philippine National Herbarium and University of Miami, Ohio; Philippine ferns (4/14-4/17).

Barbara Ertter, University of California, Berkeley; Flora of North America, *Rosa* (Rosaceae) (4/14).

Mary Barkworth, Utah State University; Poaceae; *Stipa* and *Nasella* (4/15).

Lisa Campbell, New York Botanical Garden; Xyridaceae (4/15).

Donna Ford-Wentz, West Virginia University; Portulacaceae, Cistanthe group (4/15).

Santos Miguel Niño, Herbario Universitario (PORT), Caracas, Venezuela; Flora de Guaramacal grasses and palms (4/15-4/30).

Colin Pendry, Royal Botanic Garden Edinburgh; Nepalese Polygalaceae (4/15).

L. Alan Prather, Michigan State University; Lamiaceae and Polemoniaceae (4/15).

Gerry Moore, Brooklyn Botanic Garden; *Rhynchospora* (Cyperaceae) (4/16-4/24).

Paul Berry, University of Wisconsin; Venezuelan Guyana taxonomy and molecular systematics (4/18-4/22).

Yalma L. Vargas-Rodriguez, Louisiana State University; Mexican and Central American *Acer* (Aceraceae) (4/18-4/22).

Jose Antonio Vazquez Garcia, Universidad de Guadalajara, Mexico; Mexican and Central American *Magnolia* (Magnolia-

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Travel

Carol Kelloff traveled to Georgetown, Guyana (3/30 – 4/10) to assist in moving the collections within the recently-expanded building of the Centre for the Study of Biological Diversity, University of Guyana.

Alain Touwaide traveled to Gdañsk, Poland (4/13 – 4/16) to deliver a talk at the 5th Congress of the International Association for the History of Nephrology; to Messina, Italy (5/25 – 5/28) to present a paper at the 6th International Conference on Mediterranean Studies; to San Marino, California (5/28 – 5/30) to present a lecture at the conference "Plants and Insects in the Early Modern World" organized jointly by the University of Southern California and the Huntington Library; and to Rome, Italy (6/1 – 6/30) to conduct an Earthwatch research project on 15th and 16th century printed herbals from the collections of the National Library of Rome and the Vatican Library.

Vicki Funk traveled to Seattle, Washington (5/9 – 5/10) to present two lectures to the Department of Biology at the University of Washington; to Durham, North Carolina (5/31 – 6/3) to attend the first workshop held by the National Evolutionary Synthesis Center; and to Fairbanks, Alaska (6/10 – 6/14) to attend the annual meeting of the Society of Systematic Biologists and the Society for the Study of Evolution.

Warren Wagner traveled to Kauai, Hawaii (5/9 – 8/30) to work with collaborators on the Flora of the Marquesas Islands as appointed McBryde Chair of the National Tropical Botanical Garden.

Rusty Russell traveled to Santa Barbara, California (5/10 – 5/17) to attend the annual meeting of the National Science Collections Alliance.

Maria Faust traveled to Belize (5/11 – 5/27) to collect harmful dinoflagellates.

Mark and **Diane Littler** traveled to Fort Pierce and the Florida Keys, Florida (5/31 – 7/31) to continue their on going research.

Linda Hollenberg traveled to London, England (6/10 – 6/19) to present a poster at the 20th annual meeting of the Society for the Preservation of Natural History Collections.

W. John Kress and **Vinita Gowda** traveled to Dominica and St. Kitts (WJK: 6/13 – 6/27; VG: 3/30 – 7/16) to conduct research on hummingbird pollination of Heliconias.

Michael Bordelon and **Gary Krupnick** traveled to Denver, Colorado (6/14 – 6/16) each to give a presentation at the Applied Plant Conservation Training Program at the Denver Botanic Gardens.

Walter Adey traveled to St. Lunaire Bay, Newfoundland (6/15 – 9/15) to do a quantitative benthic and algal survey and characterization of the bay.

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Chair of Botany
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A Museum of Science

The recent debates within the school boards in Kansas, Pennsylvania, and Ohio are witness to the fact that many Americans are struggling to understand the boundaries and compatibilities between scientific reason and religious belief. The former is based on the principle of using facts and evidence to test hypotheses about nature while the latter relies on personal faith to understand our place in our communities and the world. Scientific evidence and religious faith have existed side-by-side for centuries and both are important in today's society. When the distinction between the two becomes blurred, however, society and humankind are not well served.

Since 1846 the Smithsonian Institution has been committed to the "increase and diffusion of knowledge." Each of the museums of the Smithsonian has its own specific mission to achieve this goal. The vision of the National Museum of Natural History is to increase scientific knowledge and improve society's scientific literacy by inspiring the public to understand how scientists learn about the world and how science affects people's lives. Over 300 scientists and associated staff currently working in the Museum have dedicated their careers to advancing scientific knowledge.

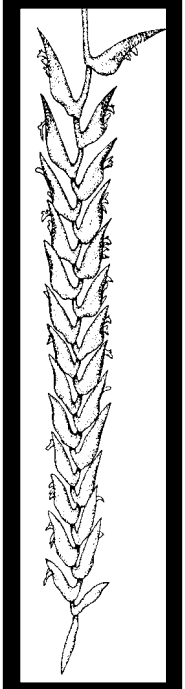
Recently, a Seattle-based think tank held a private event in the Museum to promote its belief that an intelligent creator is responsible for the origin of the Earth and the universe. A new movie was screened as part of the event. The movie presents a panorama of scientific facts about the cosmos, but fails to provide any scientific means of testing its claim that the complexity of the universe has been created by design so that humans can understand it. Although the movie attempts to persuade the viewer that scientific facts support intelligent design, no credible evidence supports this claim.

The process of science is simple: we, as scientists, pose hypotheses that make predictions about the universe around us and then gather data to see if these predictions are supported or refuted. Intelligent design is not science because it fails to make such predictions. The movie previewed during the event takes a backward look at the history of our universe and marvels at how unlikely it is that life is present on Earth. The conclusion is drawn that only an intelligent force could have designed such complexity. A scientific hypothesis that an intelligent designer was responsible for improbable events would have to posit specific ways in which such a design can be distinguished from chance alone. The outcome of the movie is to confuse faith and belief with science.

In accordance with a previously signed legal contract the evening screening of the movie took place on 23 June despite the numerous protests from many in the international scientific community over the appropriateness of holding such an event at the Smithsonian. The Museum's administration returned the donation associated with the event and at the same time cautiously and correctly distanced itself from the hosting institute and the ideas promoted in the movie. Yet the most important point about this incident can not be overemphasized: the premise of intelligent design contradicts the fundamental scientific basis of our research, which is to objectively understand the formation of the universe, the processes of evolution, the origin of humans and their cultures, and the functioning of the natural world.

Now that this event has passed, the Museum must equip itself to deal with such external attempts to present pseudoscience at the institution in the future. This recent challenge to the Museum's vision to "increase scientific knowledge and improve society's scientific literacy" should not go unheeded.

Chair With A View — W. John Kress

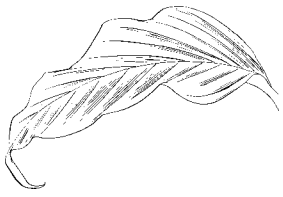


New Faces

Sara Garvey is an intern working with **Robert Faden** on Commelinaceae research from 2 June to 29 July. Garvey is going into her senior year at Nucla High School in Nucla, Colorado. She is being sponsored by the Pinhead Institute, Telluride, Colorado.

Adrienne Fritsch and **Katherine Thompson** are interns working with **W. John Kress**. Fritsch will be creating an electronic library of reprints and assisting in the creation of the Zingiberales Web site. She is from Washington D.C. Thompson, a third-year student at Smith College, Massachusetts, traveled to the West Indies to assist in the observation of hummingbird pollinators of two endemic *Heliconia* species. She will also assist in herbarium research.

The Biological Diversity of the Guiana Shield Program welcomes three summer interns. Undergraduate students, **Andrea Barnes** (Brown University), **Stephanie Stuber** (College of Environmental Science and Forestry, SUNY), and **Katie Younts** (Oberlin College) will be databasing US National Herbarium data for the Venezuelan Guayana (Amazonas, Bolívar, Delta Amacuro) in addition to other research duties of the Program under the supervision of **Vicki Funk**.



Staff Research & Activities

Six American chestnuts trees (*Castanea dentata*) were part of the American Forest Service display at the recent Smithsonian Folklife Festival on the National Mall. **Robert Faden** found out that the trees had been donated by the American Chestnut Foundation (ACF). When he telephoned Philip Pritchard, ACF Director of Development & Special Projects, in Ashville, North Carolina, he learned that two of the trees were to go to the Smithsonian's Horticultural Services and a third to the U.S. National Arboretum. Pritchard agreed that the remaining trees could be given to the City of Alexandria, where Faden and his wife, Smithsonian behind-the-scenes volunteer Audrey Faden, do a lot of public gardening. One tree was planted in Eugene Simpson Park, Alexandria, adjacent to the gardens that the Fadens help to maintain.

On 31 May to 3 June, **Vicki Funk** traveled to North Carolina to attend the first workshop held by National Evolutionary Synthesis Center (NESCent). The topic of the workshop was meta-databases and the group addressed the needs of the community in regards to databases that we have and those that we need.

Funk traveled to Fairbanks, Alaska, to attend the annual meeting of the Society of Systematic Biologists and Society Study of Evolution, 10-14 June. While there she took part in a symposium on research for undergraduates and attended the council meeting of SSB for which she serves as Treasurer.

On 10-19 June, **Linda Hollenberg** traveled to the Natural History Museum in London, UK, to attend "Realising Standards," the 20th Annual Meeting of the Society for the Preservation of Natural History Collections (SPNHC). Hollenberg presented a poster, "The United States Exploring Expedition Specimens: The Story Continues," attended a workshop, "Standards in the Care and Management of Natural History Collections," and attended committee and council meetings as the co-chair of the SPNHC Education and Training Committee and a member of the Archives Committee. She also took photographs of selected events for the SPNHC Archives.

Diana Munn-Estrada has been appointed to coordinate the planning of a new Latino Initiatives Program at the National Museum of Natural History, with funding provided by the Smithsonian Center for Latino Initiatives. Munn-Estrada's research background is in the study of Mexican cloud forests. Since September of 2003 she has worked as a contractor in the Department. The purpose of NMNH's Latino Initiatives Program will be to increase Latino and Latin American presence throughout the Museum. In the next eight months, Munn-Estrada will work closely with the Latino Initiatives Committee, chaired by William Merrill of the Anthropology Department, to define the objectives of this program and to prepare a five-year strategic plan to pursue these objectives.

Rusty Russell presented a lecture, "The Plants of the U.S. Exploring Expedition (with special attention given to Australia and New Zealand)," at the United States Botanic Garden on 8 April. Additionally, Russell presented a poster entitled "The Electronic Field Guide Project: Image Recognition and the Future of Field Work," at the National Science Collections Alliance in Santa Barbara, California, on 12-14 May.

On 17 May, **Alice Tangerini** was a visiting instructor at E.L. Haynes Public Charter School in Washington, DC, a role that came about when she was contacted by Barbara Stauffer, Office of Exhibits at NMNH, whose son attended Haynes. At the invitation of Tammy Tuck and Stephanie Wahome, two second-grade teachers at Haynes, Tangerini presented a short lecture on botanical illustration showing examples of her work and explaining her role in working for scientists at the museum. The presentation was an adjunct to the curriculum on nature studies featuring local flora. Tangerini then accompanied two classes (43 students) on a field trip to Rock Creek Park where a park ranger lectured on the identification of invasive and native plant species and Tangerini advised the students on techniques for drawing live plants.

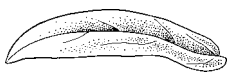
On 9 June, Tangerini spoke about botanical illustration at Watkins Elementary School on Capitol Hill at the invitation of Laurie Siegal, art instructor for grades 1-4. Siegal had selected a group of 15 students who had interest and talent in the arts to be part of the class. Tangerini provided photocopies of plant outline drawings for the students to add detail and stippling on their own using fine pointed markers. The students remained completely focused on their projects and some even started second drawings. The teachers were impressed by the attention on the drawing project and asked for possible future classes for next year.

Alain Touwaide has been invited to be a member of the scientific committee of a new series in creation on the history of botany. The series will be called "Studies in Botanical History." The editor is Vassiliki Smocovitis, Associate Professor of History of Science at Gainesville, University of Florida, and Chair of the History of Sciences Commission of the American Association for the Advancement of Sciences. The series will be published by the New York Botanical Garden Press.

Awards & Grants

Vicki Funk was elected President of the American Society of Plant Taxonomy (ASPT). She will take over as President elect in September 2005 and as President in September 2006. The annual ASPT meeting will take place in Austin, Texas, on 13-17 August.

Dan Nicolson received the 2004 NMNH Science Achievement Award for "The Forsters and the Botany of the Second Cook Expedition (1772-1775)" [with F. R. Fosberg (deceased)]; *Regnum Vegetabile* 139: 1-759. 2004. The monograph reviews the Forsters' botanical collections from the second expedition by James Cook (1772-1775) in search of the mythic Terra Australis Incognita.



New Presentations on Department Web Site

Flora of Puerto Rico and the Virgin Islands

The Flora of Puerto Rico and the Virgin Islands Web site <http://ravenel.si.edu/botany/PRFlora/index.html> features in PDF format three important publications by **Pedro Acevedo-Rodríguez** on the Flora of Puerto Rico and the Virgin Islands, and the watercolor illustrations and specimens of Agustín Stahl (1842-1917), the earliest renowned Puerto Rican scientist. Acevedo is currently curator of West Indian plants at the United States National Herbarium. His floristic work includes the study and exploration of the main islands of the Greater Antilles, but his research is currently centered in the Virgin Islands, Puerto Rico and Hispaniola. The main publications of Acevedo and collaborators on the floristics of the region are highlighted in this Web page.

The West Indian collections at the U.S National Herbarium are one of the best in the States with representatives from most islands. The herbarium also houses numerous type collections and an estimated 125,000 specimens from the region. In an effort to improve holdings of West Indies collections at US, there is an active exchange program seeking specimens that would help to increase our understanding of the floristics of this region.

Agustín Stahl worked in numerous disciplines of the natural sciences including, agriculture, archaeology, botany, ethnology, medicine, and zoology. He was responsible for writing the first full-fledged flora of Puerto Rico, "Estudios sobre la flora de Puerto Rico," published from 1883-88 in six fascicles that covered all the dicotyledons known to him to occur on the island. His flora is concise and precise, with numerous comments on botanical concepts by his predecessors and contemporaneous botanists. Stahl prepared approximately 720 watercolors intended to illustrate his flora, but they were never published. His watercolors for the most part are very accurate and artistically pleasant, depicting approximately 687 species.

Gesneriaceae Research

A Web page devoted to research on Gesneriaceae <http://persoon.si.edu/gesneriaceae/>, one of the largest families of the Lamiales as now circumscribed, is now available. The Web site contains two online publications, "The Bibliography of Gesneriaceae" and "The World Checklist of Gesneriaceae," both compiled by **Laurence Skog** and **John Boggan**. The bibliography is maintained as a searchable database, with new references being continuously added from the current literature, as well as references from the older literature when they are discovered. The checklist represents the first time that all names known to be described in Gesneriaceae have been compiled in a single searchable list. The Web site was created by **Sylvia Stone-Orli** and Boggan.

The Department has a long history of monographic and floristic work on this plant family. Conrad V. Morton worked on the family from the 1930s until his death in 1972. Shortly after Morton's death, Skog was hired to continue research on Gesneriaceae, and continues to work on the group since retiring in 2003. In large part due to the work of these two scientists, the US National Herbarium has grown to have one of the largest and richest collections of Gesneriaceae in the world, with approximately 28,000 specimens and including about 1,000 types.

Although the emphasis of the collection is on New World material, it includes many specimens from the Old World, with particularly significant holdings of Chinese, Philippine, and Pacific Island material. The Department also maintains a small living collection of approximately 300 accessions in its research greenhouses in Suitland, Maryland. Collaborative ongoing projects include an online update of Gesneriaceae for the Biologia Centrali Americana <http://www.sil.si.edu/DigitalCollections/bca> and an examination of the phylogeny, morphology, and biogeography of tribe Gloxinieae in collaboration with Eric Roalson, Washington State University, Pullman, Washington.

Onagraceae

The Onagraceae Web site <http://ravenel.si.edu/botany/Onagraceae/> features a full checklist of all taxa within each of the 18 recognized genera as well as diagnostic images for many taxa. The new classification is based on a number of phylogenetic and revisionary publications and results of a recent project initiated in the Department. A team of Onagraceae researchers, led by **Warren Wagner** and Peter Hoch of Missouri Botanical Garden, along with **Rachel Levin**, Ken Sytsma and **Elizabeth Zimmer**, worked together to gain a better understanding of the evolution of the family and to derive an appropriate classification. Using molecular, morphological, biochemical, and biogeographic tools, results have provided new insights into family relationships and monophyletic groups at the tribal and generic levels.

Plant Image Collection

The Plant Image Collection Web site <http://persoon.si.edu/PlantImages/> is library of over 18,000 photographic images of plant species and plant habitats. The Web site is intended for public as well as professional use. Images can be found by searching by plant family, scientific name, common name, photographer, or any combination of terms. Search results are displayed as tables of thumbnails; each thumbnail includes the plant name and a check box to add the image to a "Wish List." The Wish List may be used as a means to display the results of a search, but it is also intended to be used as an order form for those who wish to obtain higher resolution images. Almost 150 photographers have contributed the 15,000 images to the Web site. While the photographers do include Smithsonian botanists, numerous other individuals have donated substantial numbers of slides for use in this collection.

The Catalogue of New World Grasses

In addition to adding content to the Department's Web site, research scientists within the Department are actively engaged in the scientific content of other Web sites. **Paul Peterson** and **Robert Soreng** are part of a team of agrostologists who have put together the Catalogue of New World Grasses (CNWG) Web site <http://mobot.mobot.org/W3T/Search/nwgc.html>. CNWG recently

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Natural History Research Proves Integral for Plant Conservation

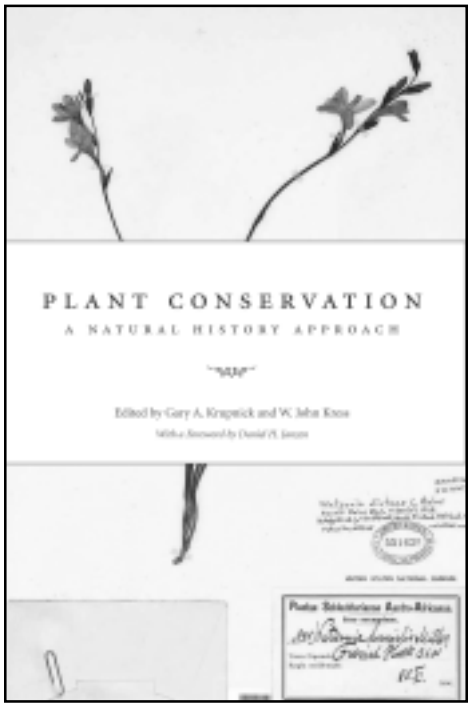
Effective conservation of biodiversity is dependent upon a firm understanding of the basic biological attributes of species. The immense data on plants and animals contained in the collections of the world's natural history museums, herbaria, and botanical gardens have always been critical for conservation purposes, but only recently have museum scientists become active in assessing and developing environmental management programs. In a recently published book, *Plant Conservation: A Natural History Approach* edited by **Gary A. Krupnick** and **W. John Kress** (University of Chicago Press), scientists from the National Museum of Natural History at the Smithsonian Institution along with their collaborators have presented a convincing portrait of the importance of museum research for effective conservation assessment and management.

Plant Conservation explores the value of botanical collections and museum science in contemporary biodiversity conservation studies. Plant conservation is explored from a natural history perspective through the actions, observations, and investigations of botanists in the field, herbaria, and laboratory. No less than 27 scientists from the Smithsonian Institution (24 from the Department of Botany) participated in writing the book. They were joined by 21 collaborators representing research institutions in the USA, Brazil, England, Germany, Scotland, and Venezuela.

Plant Conservation is launched with a provocative foreword by Dan Janzen and then proceeds with a broad view of plant biodiversity, a consideration of evolutionary and taxonomic consequences of habitat alteration, a review of specific threats to plant diversity (such as invasive species and global climate change), a discussion of the consequences of plant population decline at the ecological, evolutionary, and taxonomic levels, an assessment of techniques for mapping centers of botanical diversity, and, finally, an overview of management strategies that protect plant biodiversity from further decline.

In this book, plants are considered in their broadest sense, including marine algae, unicellular dinoflagellates, lichens, mosses, and flowering plants, while a multitude of habitats from all corners of the globe are covered from species-rich tropical rain forests to underwater kelp forests.

Plant Conservation emphasizes the role museums and botanical gardens with their rich holdings of scientific collections and unique perspective on the diversity of life will ultimately play in the future of biodiversity conservation.



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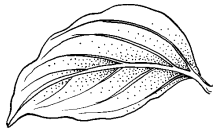
DNA Barcoding Can Be Applied to Plants

DNA barcodes, short DNA sequences for species-level identification, have now been successfully applied to flowering plants. In a paper entitled "Use of DNA barcodes to identify flowering plants," published in the *Proceedings of the National Academy of Sciences USA*, **W. John Kress** and colleagues **Ken Wurdack, Elizabeth Zimmer, Lee Weigt**, and Daniel Janzen describe their methods for identifying two DNA barcodes that can now be applied as a practical and standardized tool for species identification in biodiversity assessment, life history and ecological studies, and forensic analysis of plants. The cytochrome c oxidase (CO1) sequence, which has been found to be widely applicable in animal barcoding, is not appropriate for most species of plants due to a much slower rate of COI gene evolution in higher plants than in animals. The two regions identified by Kress and colleagues are the nuclear Internal Transcribed Spacer (ITS) and the plastid *trnH-psbA* intergenic spacer. Herbarium collections, such as the 4.7 million specimens maintained in the U.S. National Herbarium, provide a documented source for building the plant barcode library. In this study, plant specimens over 100 years old were tested and shown to be usable for DNA barcodes.



Web Site

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added a new utility. Now lists of all accepted taxa by New World country, from Greenland to Argentina and Chile can be retrieved. Caribbean taxa from all the island countries are listed collectively as these are not currently subdivided. Each name on the lists is linked to the CNWG taxon record, with information on original publications, basionyms or types, synonyms, secondary literature citations of the name, country distribution, specimen lists and maps, images, and links to other resources. There is also an option to send a country list (including original publications) through e-mail. This newly added utility is as a good way of generating regional checklists and floras.

Much new data have been added since the publication of the primary data in 4 volumes in the *Contributions from the U.S. National Herbarium* (vols. 39, 41, 46 & 48), along with corrections, newer taxa, and updates to the classification <http://mobot.mobot.org/W3T/Search/nwgclass.html>. Old World grass names data are also searchable via the Web site, although one can often see more data for taxa that do not occur in the New World via the W3Tropicos link <http://mobot.mobot.org/W3T/Search/vast.html> where chromosome numbers and specimen lists and maps are available for any name. There are about 79,000 grass names in Tropicos, from supergenera down to forma.

Slides Go Digital

By Heijia L. Wheeler

When faced with a complex and seemingly monumental task, one reaction is to simply walk away. Then there are a few very special people who jump right in and, with creative energy and patience, tackle that mountain. Fran Pitlick is one of those special people. She is a retired biochemist and cell biologist who spent ten years as a bench scientist at Yale University, and another ten years at the National Institutes of Health, before taking on several executive administrative jobs for another twelve years. She began her volunteer tenure with **Rusty Russell** in the Department about three years ago.

A long standing project in the Department has been to convert the vast collection of photographic slides to digital images and create a user-friendly database for searching and finding a particular image with descriptive information about each slide. The Department has tens of thousands of slides which will be converted to the digital format. There are inherent problems with storing photographic slides. They are bulky, take up large amounts of storage space and are hard to access. They also deteriorate and fade over time. Digitizing them not only preserves the images, they can often be "repaired" by color enhancement and other restoration techniques. More than 18,000 photographic slides have been scanned and there are thousands more yet to be digitized. Pitlick started her volunteer activities working on the bamboo slide collection left behind by Tom Soderstrom. More recently, she has worked with Russell to standardize and compile the databases.

Many other volunteers have had a part in scanning these slides for the database. Lizzie McGee, another volunteer, spent eight hours, every Tuesday for over a year going through the slide collection and scanning them into the database. McGee is a graphic designer and has moved on to start her own business. Alexandra Wright took over where McGee left off and the work continues. Wright is a Latin scholar with degrees from the University of Durham and Oxford University in England. She has also attended Harvard University on this side of the pond. Over all that time, Pitlick has overseen the project and trained the other volunteers.

Volunteer Fran Pitlick (Photo by Deborah Bell)

She is the constant on this project. As volunteers leave for various reasons and others come to take their place, Pitlick helps train them and makes sure there is consistency and accuracy. In the past year, Pitlick, Russell and **Ellen Farr** created an interactive Web site with more than 18,000 images, scanned by several volunteers. The database and images can be accessed at the Plant Image Collection Web site <http://persoon.si.edu/PlantImages/>, which provides information to not only satisfy the curiosity of lay botanists, but also provides vital information to research botanists all over the world (see Page 5).

While Pitlick was working on the digital imaging project, the museum's Natural Partners Office was developing a Web site to commemorate the bicentennial of the Lewis and Clark Expedition (1803 - 1806), considered by most historians as one of the most important expeditions in the history of the United States. Pitlick was asked to help collect images and annotate the plants and animals that Lewis and Clark described in their field notes for the Web site. The project sparked an immediate interest in Pitlick. Her search for photographic slides to include in the Lewis and Clark Web site <http://www.mnh2.si.edu/education/lewisandclark> is linked to her work in the Department and she has divided her time between the two ever since.

Pitlick has taken on yet another project for Natural Partners. She is helping to gather content for the *SI Guide*, which will be a hand-held PDA to be rented to museum visitors. These visitors will be able to see on the screen additional images, sounds and voice explanations of various exhibits in the National Museum of Natural History. The exhibit on birds, for example, will have range maps, field photos, video clips and bird calls, which can be accessed through a wireless system. There are over 150 bird exhibits completed. The plan is to create similar data input for the entire museum. The work is well under way for exhibits on birds, mammals, insects, gems and minerals, in the African Voices Hall and the Western Civilization Hall, and a map of the museum to guide the visitors from exhibit to exhibit.

Pitlick confesses that she really likes solving puzzles and she loves being able to use her creative energies and imagination in working with complex systems. She enjoys the people at the Smithsonian, learning to use new technologies, and creating and managing data bases. She is truly a priceless gem.

Visitors

Continued from page 2

ceae) from Mexico & Central America. (4/18-4/22).

Tom Wendt, University of Texas; Piperaceae and Polygalaceae (4/19).

Enesto Medina, Centro de Ecología – Instituto Venezolano de Investigaciones Científicas (IVIC), Venezuela; South American *Clusia* (4/23-4/27).

Jeffrey M. Saarela, University of British Columbia; Californian *Bromus* and *Calamagrostis* (Poaceae) (5/9-5/20).

Bill Summers, B & W Quality Growers Inc., Florida; watercress (5/12-5/13).

Frank Almeda, California Academy of Sciences; Biological Diversity of the Guiana Shield Project, Melastomataceae (5/18-6/1).

Darin Penneys, University of Florida; Biological Diversity of the Guiana Shield Project, Melastomataceae (5/19-5/31).

David Taylor, Indiana University Southeast; Cabombaceae, fossil leaves (5/23).

Heroen Verbruggen, Ghent University; *Halimeda* (5/25-6/11).

Catherine Furlong, Independent researcher; volunteer interview (5/26).

Chhimi Dolma, National Biodiversity Centre, Ministry of Agriculture, National Herbarium, Thimphu, Bhutan; Biological Diversity of the Guiana Shield Project (5/29-7/29).

Claudia Isabel Rodriguez-Flores, Universidad Nacional de Colombia, Herbario Nacional Colombiano, Instituto de Ciencias Naturales; South American Gesneriaceae (5/29-6/27).

Hannah Baker, Independent researcher; volunteer interview (6/1).

Annette Olson, United States Geological Survey; Image management (6/3).

Ping-Ta'o Li, South China Agricultural University; Flora of China: Euphorbiaceae, Apocynaceae, Asclepiadaceae, Annonaceae and Loganiaceae (6/6-6/12).

Nian He Xia, South China Botanical Garden, Chinese Academy of Sciences; Flora of China, Bambusoideae (Poaceae) and Magnoliaceae (6/6-6/12).

Katie Walther, Independent researcher; volunteer interview (6/7).

Ben Torke, Missouri Botanical Garden; *Swartzia* (Fabaceae). (6/15-6/19).

Lucinda McDade, Academy of Natural Sciences; Costa Rican Acanthaceae (6/17).

Andrew Henderson, New York Botanical Garden; Indo-Chinese Arecaceae (6/27-7/15).

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Smithsonian
Botanical Symposium

Rzedowskis Receives Fifth Cuatrecasas Medal

Jerzy Rzedowski and Graciela Calderón de Rzedowski of the Instituto de Ecología del Bajío in Michoacán, Mexico, are the joint recipients of the 2005 José Cuatrecasas Medal for Excellence in Tropical Botany presented at the 5th Annual Smithsonian Botanical Symposium. The medal is in honor of José Cuatrecasas, a pioneering botanist and taxonomist who spent nearly a half-century working in Botany at the Smithsonian Institution. Cuatrecasas' research, especially in the flowering plant family Asteraceae, was devoted to the classification, biogeography, exploration, and ecology of plants of the paramo and subparamo regions of Andean South America. Out of enduring respect and admiration, the José Cuatrecasas Medal for Excellence in Tropical Botany was established. This medal is presented annually to a botanist and scholar of international stature who has contributed significantly to advancing the field of tropical botany. The award serves to keep vibrant the accomplishments and memory of this outstanding scientist.

The recipient of the Cuatrecasas Medal is selected by a committee made up of botanists on the staff at the National Museum of Natural History, in consultation with other local plant scientists in the Washington area. This year the Committee was composed of **Laurence Dorr** (Chair), **Pedro Acevedo**, Alan Whittemore, and Pat Herendeen. Nominations for the Medal are accepted from all scientists in Botany at the Museum. The award consists of a bronze medal bearing an image of José Cuatrecasas on the front with the recipient's name and date of presentation on the back.

This year selection committee broke with tradition of honoring a single botanist and offered the award jointly to the Rzedowskis. While their individual contributions are meritorious, the committee could not overlook the enormous contribution their joint efforts have made to tropical botany. Every student of Mexican botany is proud to own a copy of *Vegetación de México* (1971); the *Flora Fanerogámica del Valle de México* (1979; 2001, 2nd edition) is an impressive catalog of the flora of one of the world's largest metropolitan areas; and the *Flora del Bajío y de Regiones Adyacentes* (1991-x) is a monument to scholarship, organization, and dedication. The award committee also was impressed with their many papers and monographs dealing with diverse flowering plant families, but most notably the work leading to a monograph of the genus *Bursera* (Burseraceae) in Mexico.

Dorr made the award presentation noting the Rzedowski's contributions to tropical botany. He then introduced Victoria Sosa from the Instituto de Ecología in Xalapa, who read a message from the Rzedowskis expressing their appreciation for the honor and their regret at not being able to attend the ceremony. The Rzedowskis expressed the following sentiment:

> "The knowledge of the plant universe of intertropical regions of our Planet is still far from being complete, in spite of the efforts of numerous generations of botanists. It is our belief that the elaboration of reliable and critical floristic inventories constitutes one of the fundamental priorities of the biological research in our countries. Consequently we dedicated more than 40 years to such an activity. Hopefully, the results of this Symposium will propitiate and contribute to expand and render more efficient similar efforts, looking forward toward the production of a reasonably complete World Flora."

Graciela Calderón de Rzedowski and Jerzy Rzedowski, joint recipients of the José Cuatrecasas Medal for Excellence in Tropical Botany.

Abstracts from the Speakers of the Smithsonian Botanical Symposium

The fifth annual Smithsonian Botanical Symposium was held 15-16 April 2005. The symposium, "The Future of Floras: New Frameworks, New Technologies, New Uses," addressed how new technologies will further the inventory and classification of life. Below are the speakers' abstracts from the papers that were presented.

Speakers of the 2005 Smithsonian Botanical Symposium (from left): P. Bryan Heidorn, Scott Miller, David Jacobs, Vicki A. Funk, David F. Farr, Robert A. Morris, Vincent Savolainen, W. John Kress (Photo by Elaine Haug).

Vicki A. Funk
Smithsonian Institution
Floras: A Model for Biodiversity Studies or a Thing of the Past?

Today taxonomists face universal questions as well as the traditional taxon based ones. In addition to "How many species are there?" and "Where do they grow?", we also contribute answers to questions such as "What are the global patterns of diversity in the group?", "How important are certain taxa?", "Are endemicity levels real?", "What taxa should be conserved?" and "Can one taxon serve as the surrogate of another?" One major source of information for helping answer such questions is a flora. Floras have a long and rich tradition; however, lately we have heard comments about the lag time between when specimens are collected and when they are identified, the amount of time it takes to describe new taxa, and the time it takes to finish floras. This has been referred to as the "Taxonomic Impediment," and it is sometimes laid at the feet of taxonomists.

With regard to floras, I see two issues to discuss: (1) a reconsideration of what makes up a flora and where it fits in science, and (2) what can be done to increase the speed of their production. First, we have to stop thinking of floras as an end unto themselves and look at them as a part of a continuum. Specimens lead to checklists which develop into floras which underpin biodiversity studies. Biodiversity studies depend on accurate identifications and form the basis for answering general questions used in conservation decisions. The failure to see the link among floras, biodiversity studies, and conservation has resulted in a lack of recognition of the importance of floras. Second, there are some things that are being done to speed up the information flow and increase the rate at which floras are produced. Available tools allow the writing of floras on-line as well as the production of interactive keys. Likewise the posting on-line of completed parts of floras allows the dissemination of information as soon as possible. In addition, we must change our attitudes about floras and stop thinking that all treatments have to be completed before they can be made available. Future possibilities include putting on-line images of type specimens and literature along with databases of specimens in museums. This endeavor seems to have captured the imagination of many and while it will save some time it will take a lot of money and staff. And our biggest problem, the lack of taxonomists, will not be addressed by the internet.

So there are some things that can be done to make data available more quickly and we can assemble floras faster; however, without additional funds to triple the number of taxonomists and to curate and database the specimens and literature, it will only be a small increase. And most important, without the floras the specimen information will be suspect and the resulting answers to biodiversity questions will lead to poor conservations decisions.

David F. Farr
United States Department of Agriculture
On-line Keys: More than Just Paper on the Web

The Internet has opened new opportunities for the distribution of systematic information. Advantages such as immediate worldwide distribution, affordable presentation of color illustrations, ease of updating the information, and low cost all suggest that the Web would be an ideal medium for the publication of keys.

Using examples from the on-line interactive keys published on USDA's Systematic Botany and Mycology Laboratory's Web site and other on-line keys, the important attributes of an on-line key will be discussed. These will include the use of standard internet protocols, emphasis on images, easy maintenance by scientists without intervention of IT staff, and the point that morphological data should be external to the key program.

While the potential of Internet keys may be obvious there are hurdles that must be overcome before there is any significant proliferation of on-line keys. Systematists must embrace the Web as a

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Abstracts

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primary publishing option, peer review must recognize the significance of non-paper publication, and systematists need to incorporate more granular procedures for data collection.

David Jacobs
University of Maryland
Using Computer Vision to Help Biologists Recognize Organisms

Biologists are building vast collections of digital images. This offers us the opportunity to build automatic systems that assist in identification tasks by matching a new image of an organism to a data set of thousands or millions of images. As a sample application, I will describe our project to build a system aimed at allowing a botanist to photograph a leaf in the field and use computer vision techniques to help match this image to a digital collection of about 100,000 type specimens.

I will first provide an overview of the state of the art in image matching. I will describe how leading approaches have been influenced by the work of biologist D'Arcy Thompson and by studies of biological vision systems. By far the most studied problem in the identification of organisms is the problem of recognizing human faces, so I will describe some lessons we can draw from that work. I will then describe work on matching leaves, including our own recent algorithms.

I will also emphasize the need to integrate these image matching algorithms into a complete system for image retrieval. While fully automatic systems are out of reach, we hope to build systems in which automatic matching can assist an expert in finding the most relevant information. I will describe some components we are using to build our system.

P. Bryan Heidorn
University of Illinois at Urbana-Champaign
Beyond Paper on the Web: Adapting Paper-based Flora for the Digital Environment

One of the primary challenges for the creation of digital libraries is to enhance the value of paper-based publications by providing digital access to the materials. Simple full-text (Google-like) searching is just a first step in this process. The time tested internal structure of paper-oriented documents and multi-volume collections has evolved to address specific information needs. These structures can be more fully exploited in the process of digital conversion of the material. Some structural aspects of paper-based publishing are difficult to bring to the electronic medium but should be preserved. Other structural aspects of paper documents are artifacts of limitations of the paper medium. Frequently these artifacts of paper, such as document linear sequencing, can be improved in digital format. In this talk I will describe a project to improve information system functionality by exploiting the natural structure within text as well as the inherent information structure of the domain of Flora (which can not always be represented in the paper medium). I will discuss the process of digital conversion and integration of taxonomic (morphological) descriptions, glossaries and categorical thesauri. The Biological Information Browsing Environment team <http://www.biobrowser.org> developed programs for the digitization included automatic text segmentation, automated XML markup, taxonomic browsing, structure-based indexing, automatic thesaurus extraction for query expansion, on-line definitions and finally web-based visualization tools. The last part of the presentation addresses the evaluation of the toolkit. The object of the design is not to return facsimiles of traditional paper-based publications but to alter the information structure to allow more natural access to the materials.

Rita Colwell, delivering her keynote address, "Biocomplexity and Global Infectious Diseases: An Odd Couple" at the Smithsonian Botanical Symposium. (Photo by Elaine Haug)

Robert A. Morris
University of Massachusetts Boston
A Few Keys Here, a Few Web Services There, Some Databases Anywhere, a Little XML and Pretty Soon It Adds Up to Real Electronic Field Guides

Service Oriented Architectures permit information sources anywhere on the web to be accessed by applications that might not have been envisioned by the data providers at the time their databases were designed and deployed. Using an abstraction we call "Property List Decorated Graphs," I will describe how we provide authors of taxonomic identification keys a simple spreadsheet interface with which to build flexible keys, that can use web services to transparently call for data, illustrations, descriptive taxon pages

Acknowledgments

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

Organizers
- Laurence Dorr
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- Patricia Davis
- Ellen Farr
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- Sue Lutz

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- Holly Shimizu and the United States Botanic Garden staff

Photographer
- Elaine Haug

Plant material
- Barbara Faust, Jeff Schneider, and the Horticulture Services Division at the Smithsonian Institution

And many others who had helped in a myriad number of ways.

(either static web pages, or created on-the-fly by applications making database service calls), range maps, or, indeed, the result of any service accessible on the web that can be discovered by the key software at run time. Because the key implementation is derived from an XML tree produced from the spreadsheet, many different kinds of keys–some novel, some familiar, all web-accessible–are deployed in seconds. I will illustrate with a key to the plant families of Costa Rica and with a winter key to the invasive plants of New England. Time permitting I will discuss a new proposed international standard for the representation of descriptive data in XML suitable for some of the services mentioned above. The XML Schema for the Structure of Descriptive Data (SDD) is presently going through the standards process of the Taxonomic Data Working Group (TDWG) of the International Union of Biological Sciences. SDD is a mechanism by which communities can provide shared controlled vocabularies for describing, among other things, taxa, specimens, and identification keys. SDD does not proscribe what those vocabularies are, but rather constrains how to express them in XML and how to use them in descriptive data either generated by a database or in markup for taxonomic treatments in digitized legacy literature. One phyloinformatics research group is exploring the use of SDD as a generalization of the Nexus file format for taxon–by–character matrices.

Vincent Savolainen
Royal Botanic Gardens, Kew
DNA Barcoding in Plants: Prospects and Problems

DNA barcodes are short DNA sequences from a uniform part of the genome used for species-level identification. DNA barcodes will enable expertise to be more accessible to conservation users (e.g., CITES authorities), potentially using handheld electronic DNA analysers. A consortium for the Barcoding of Life <http://www.barcodinglife.org/> has been set up and is hosted by the Smithsonian Institution. The first conference on the topic was held in London in February where a plant working group for the barcoding of life was launched. This talk will present an overview of prospects and problems in barcoding plant life, especially in comparison with the apparent ease of CO1-barcodes in animals, and reporting on this major conference. Using examples studied across a wide range of angiosperms studied at Kew and from a current collaborative project on DNA banking of the South African flora, I will also discuss species and generic DNA-based identification for conservation, including the use of GenBank data-mining and the interface with tree-of-life initiatives.

Symposium

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ing the big questions of biogeography. The differences between checklists, floras, and biodiversity studies have become blurred; floras are part of a continuum among checklists, monographs, databases, biodiversity studies, and expeditions. Funk concluded by pointing out the current impediments to taxonomy: the lack of a new generation of taxonomists, the lack of scientists willing to take on long-term commitments to their research, the level of funding to taxonomic studies, and the lack of strong leaders in the field of taxonomy.

The next speaker in the morning session was David Farr, Research Botanist at U.S. Department of Agriculture's Systematic Botany and Mycology Laboratory. Farr's talk, "On-line Keys: More than Just Paper on the Web," explored how the Internet can be used for the identification of species through display images and distribution maps. A strong proponent of on-line keys, Farr explained how users can manage their own data by editing descriptions, images, and tables in a dynamic environment. Many of the on-line keys use programs such as Microsoft Access, ColdFusion, and Java script. The examples provided included the complete worldwide interactive key for *Ravenelia* <http://nt.ars-grin.gov/taxadescriptions/keys/RaveneliaIndex.cfm>, a fungal genus whose species predominantly parasitizes members of the Fabaceae.

Next, David Jacobs, Associate Professor at the University of Maryland, spoke on "Using Computer Vision to Help Biologists Recognize Organisms." Jacobs, the first non-botanist to speak at the botanical symposium, described how shape matching algorithms can be useful in identifying specimens by comparing the shape of leaves from an unknown species to the shape of leaves of a digitized type specimen. Using Plummers Island,

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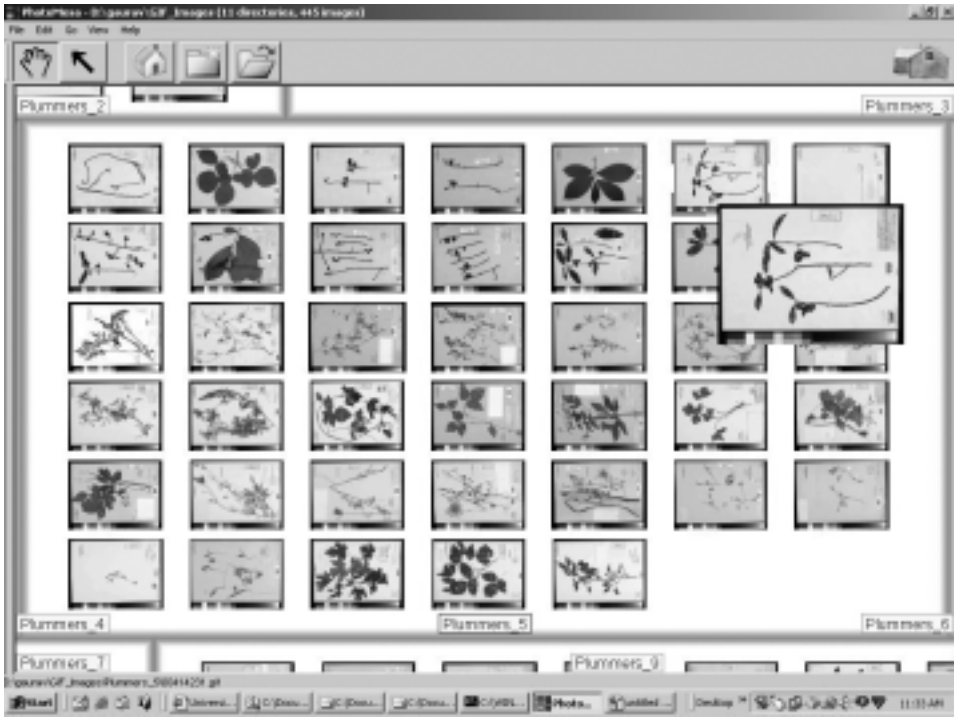


Plant imaging technology, which will compare leaf samples to herbarium specimens, was discussed at the Symposium. (Photo by David Jacobs)

Symposium

Continued from page 13

Maryland, as a prototype system, he and colleagues at Columbia University and the Smithsonian Institution have been performing tests using a set of 130 plant species. Their goal is to develop a hand-held device containing information about relevant species within a given region that will photograph a leaf in the field and compare it to a digital collection. The remaining challenges include the ability to scale up to more species and the need for better recognition techniques.

P. Bryan Heidorn, Associate Professor at the University of Illinois at Urbana-Champaign, next presented "Beyond Paper on the Web: Adapting Paper-based Flora for the Digital Environment." Stressing the importance of reinventing how floras are published, Heidorn argued that monographs should include a central Web site forming a digital library, which will change the function of the publication. Previously, different people would independently publish the taxonomy, description, and distribution of a species. These parts should be reassembled on a species Web page. For example, the Biological Information Browsing Environment (BIBE) <http://www.biobrowser.org/> allows users to search database for a species description based on characteristics of their choice.

Heidorn explained how a digital library is constructed from a published resource, such as the Flora of North America. By adding structure to paragraphs, tags can be added to taxonomic descriptors, such as habitat, type of leaf, leaf length, type of flower, and number of chromosomes. The main problem is that published floras differ in their format, making automatic mark-up a challenge.

Winner of the longest title at the symposium, Robert Morris, Professor at the University of Massachusetts at Boston, next spoke about "A Few Keys Here, a Few Web Services There, Some Databases Anywhere, a Little XML and Pretty Soon It Adds Up to Real Electronic Field Guides." Before his talk, all participants received a "trading card" of an unknown plant species with the challenge of identifying it using the Web-based "Electronic Field Guide" (EFG) <http://efg.cs.umb.edu/keys>. During his talk, Morris gave a demonstration of an online dichotomous key. He explained how a plant can be keyed out to family using a variety of functions: a java-based picture key, a printable text-only key, and a "browse all" function which allows the viewer to see all images.

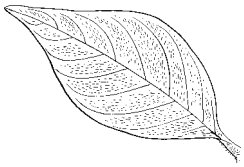
The final invited talk was by Vincent Savolainen, Plant Molecular Systematist at the Royal Botanic Gardens, Kew, who spoke on "DNA Barcoding in Plants: Prospects and Problems." DNA barcoding may revolutionize how species are discovered and described using new molecular techniques. Savolainen first assessed a number of approaches to DNA barcoding. He discussed which markers can be used in plants, including such possibilities as mitochondrial DNA, ribosomal DNA (ITS), low-copy nuclear DNA, and plastids (DNA regions). He then described how DNA barcoding can be used as a tool for the genetic delimitation of species. Finally, Savolainen discussed future considerations within the field, such as using DNA barcoding to tag cycads for trade surveillance and to prevent thievery, and using DNA barcoding on Costa Rican orchids to build the orchid Tree of Life.

> "Data in a flora is fossilized on a page"
>
> – P. Bryan Heidorn

Scott Miller, Senior Biodiversity Advisor to the Director of the National Museum of Natural History, concluded the afternoon session with a "Summary and Perspective." He began by arguing that we know much more about biodiversity than we think we know. For instance, using museum collections, it is possible to identify 80 percent of the moth species of New Guinea. The distribution of scientific data, however, is very poor. Africa, for example, has very few collections compared to North America. Ideally, all data should be available worldwide using simple queries. Key data, such as species names, specimens, literature, and attributes of the species, are scattered across many different databases. Miller described the latest technologies that will synthesize all the data. Furthermore, many international initiatives will speed up the integration of data: the Global Biodiversity Information Facility (GBIF), the Consortium for the Barcode of Life (CBOL), and the Encyclopedia of Life (EOL).

A stirring keynote address was presented at the conclusion of the symposium by Rita Colwell, Chair of Canon US Life Sciences, Inc. On the topic of "Biocomplexity and Global Infectious Diseases: An Odd Couple," Colwell addressed how the knowledge of biodiversity can be applied in ways to prevent the spread of infectious diseases such as malaria and hantavirus. For instance, cholera, a global disease that dates back to 1849 in England, continues to cause thousands of cases each year. It is a very difficult organism to understand, but new technology is allowing scientists to study the dormant stage before an outbreak may hit. Cholera outbreaks have also been correlated directly to sea surface temperatures. In Bangladesh, health workers are urging village women to use their saris, folded in a specific way, as a filtration system during predicted outbreaks. Applying scientific information in such a sensible way has reduced cholera cases in that region by 50 percent. Colwell gave further examples of practical purposes using biodiversity knowledge and modern technology.

Next year, the Smithsonian Botanical Symposium will look at island archipelagos, their biology, geography, and conservation. All are invited to attend.



Supplementary Symposium Links on the Web

The Web site to the 5th Annual Smithsonian Botanical Symposium <http://persoon.si.edu/sbsarchives/sbs2005/> has many links and documents related to the conference. Included on the Web site is the full program, abstracts of the talks, links related to the speaker's presentations, other online floras suggested by participants, and selected images from the various events. Additional items related to the symposium can be added to the list of links and documents by sending an E-mail to sbs@si.edu.

Additional Scenes from the Smithsonian Botanical Symposium

From left, Alice Tangerini, Bayard Whitmore, Deborah Bell, and Marion Lobstein enjoy the evening reception. (Photo by Elaine Haug)

Christine Flanagan and Symposium speaker Scott Miller have a discussion during the opening reception. (Photo by Elaine Haug)

Afro Bop Alliance perform for the participants of the Smithsonian Botanical Symposium. (Photo by Elaine Haug)

Participants enjoy dinner in the Rotunda of the Museum. (Photo by Elaine Haug)

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- International Association for Plant Taxonomy
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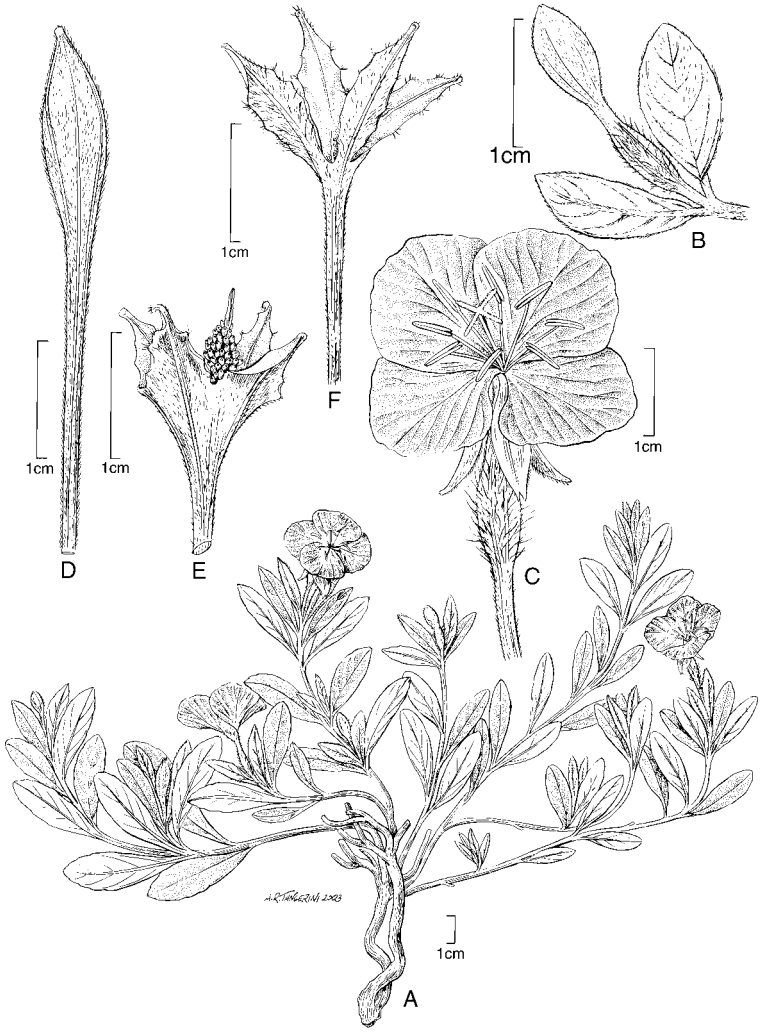
Art by Alice Tangerini

Oenothera deserticola (Loes.) Munz

The Department's Web site has several new presentations, including one devoted to Onagraceae, the evening primrose family (see page 5). Pictured here is *Oenothera deserticola*, a drawing featured in Warren Wagner's treatment of Mexican species in *Oenothera* sect. *Hartmannia* (*Novon* 14: 124–133. 2004). *Oenothera deserticola* is characterized by decumbent stems, morning-opening flowers, rose purple petals, and angled, but unwinged capsules with an attenuate apex. The species is from the transvolcanic region of Mexico.



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