

The Plant Press



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Botany Profile

Taking Aim at the GSPC Targets

By Gary A. Krupnick and W. John Kress

In 2002, the Convention on Biological Diversity (CBD), a global treaty signed by 188 countries addressing the conservation and sustainable use of biological diversity, adopted the Global Strategy for Plant Conservation (GSPC), the first CBD document that defines specific targets for conserving plant diversity. The 16 targets are grouped under five major headings: (a) understanding and documenting plant diversity; (b) conserving plant diversity; (c) using plant diversity sustainably; (d) promoting education and awareness about plant diversity; and (e) building capacity for the conservation of plant diversity.

The National Museum of Natural History is a member of the Global Partnership for Plant Conservation, which brings together international groups to contribute to the implementation of the GSPC. A leader in plant taxonomy and evolution, NMNH's Department of Botany and the U.S. National Herbarium (USNH) together have made great strides in contributing and addressing many of the GSPC targets. These contributions take the form of scientific papers and books, electronic publications, symposiums and informal lectures, new species descriptions, specimen collections, and making many specimens of the USNH collections accessible over the internet.

The Plant Conservation Unit at NMNH has been tracking the progress that the Department has made in contributing to the implementation of the GSPC targets. Listed below

are the contributions that the Department has made towards achieving the 16 targets since the Strategy's inception in 2002.

Understanding and Documenting Plant Diversity

Target 1: A widely accessible working list of known plant species, as a step towards a complete world flora

One of the Department's core missions is to discover and describe plant life in marine and terrestrial environments. Thus, one primary objective is to conduct field work in poorly known areas of high species diversity. As a result our scientists publish articles that describe new species, produce checklists and monographs, and contribute to floras. Each of these actions advances the creation of a working list of the world's flora.

Since the inception of the GSPC in 2002, the Department has described 240 new taxa, revised 1,988 taxa, included 23,939 species in checklists and floras, and published 5,721 pages of information that document plant diversity. Further, the Department is actively involved with and have contributed to many flora projects from around the world, including the Flore Analytique du Bénin, Flora of the Caribbean, Flora of China, Flora of Ecuador, Flora of the Guianas, Flora of the Hawaiian Islands, Flora of the Marquesas Islands, Flora of Myanmar, Flora Neotropica, Flora of North America North of Mexico, Flora of Puerto Rico and the Virgin Islands, Flora of Somalia, Flora of Venezuela, and Flora of the Washington-Baltimore Area.

The data and images of more than 95,000 type specimens of algae, lichens, bryophytes, ferns, gymnosperms and angiosperms are available on USNH's Type Specimen Register at <http://ravenel.si.edu/botany/types/>. A multi-DVD set containing images of 89,000 vascular type specimens from USNH has been produced and distributed to institutions around the world. In addition, data from 778,054 specimen records have been inventoried in the EMu catalogue software.

In addition, USNH is a partner in producing the *Global Working Checklist of Compositae*. This collaborative project will produce a working checklist of the approximately 25,000 species and 75,000 synonyms of the Compositae by 2010. A grant from the Global Biodiversity Information Facility (GBIF) to Landcare Research in Lincoln, New Zealand, is paying for the first 18 months of this international project.

Target 2: A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels

At a series of recent international biodiversity conferences it has been emphasized that the world's herbaria have the opportunity to contribute significantly to meeting Target 2 through the vast information contained in their plant specimens. Gary Krupnick and W. John Kress have created an

Continued on page 11

Visitors

Wenyang Wu, Philipps University, Marburg, Germany; *Nolana* (Solanaceae) (2/28/06-2/27/08).

Hui Ren, South China Botanical Garden, Guangzhou; Vitaceae (5/7/06-4/1/07).

Zhiduan Chen, Institute of Botany, Chinese Academy of Sciences, Beijing; *Parthenocissus* (Vitaceae) (9/22-12/20).

Carol Allen, U.S. Botanic Garden; Tour greenhouse and exchange plants (10/3).

Jonathan Deeds, Food and Drug Administration; Dinoflagellate collection (10/5).

Gustavo Romero, Oakes Ames Orchid Herbarium, Harvard University; Neotropical Orchidaceae (10/5-10/6).

Mark Suddleson and **Patricia Tester**, National Oceanic and Atmospheric Administration; Dinoflagellates (10/5).

Manny Burstein, Queens College; Digital imaging project (10/10).

Carlos M. Ochoa, International Potato Center, Peru; Solanaceae and Amaryllidaceae (10/12-10/13).

Rodrigo Bernal, Instituto de Ciencias Naturales, Universidad Nacional de

Colombia, Bogota; Colombian palms (Arecaceae) (10/15-11/9).

Marcus Lehnert, University of California at Berkeley; Neotropical ferns (Cyatheaceae) (10/16-10/20).

Alejandra Vasco, New York Botanical Garden; *Elaphoglossum* subsection *Muscosa* group (Dryopteridaceae) (10/16-10/24).

Raymund Chan, National University of Singapore; Asteraceae (10/23-11/8).

Richard Rabeler, University of Michigan; Caryophyllaceae and Scrophulariaceae (10/24-10/25).

Yuen-po Yang, Sun Yat-sen University, Kaohsiung, Taiwan; Asian *Castanopsis* (Fagaceae) and *Veronicastrum* (Scrophulariaceae) (10/24).

Renato Goldenberg, Universidad de Federal do Parana, Curitiba, Brazil; Melastomataceae (10/30-11/3).

Fabian Michelangeli, New York Botanical Garden; Melastomataceae (10/30-11/3).

Kasha Helget, Graduate School, United States Department of Agriculture; Fall DC Woody Plant Identification Class, tour herbarium (11/13).

Judith Holt, Ann Olsen and Narayan Patel, Earthwatch Institute; Medicinal plants of Antiquity (11/13-11/17).

Peter Wieczorowski, DC Woodlands; Discuss work of "DC Woodlands" (11/15).

Heroen Verbruggen, Ghent University, Belgium; Green algae (11/21-1/1).

Meg Ojala, St. Olaf College; C. Geyer 1838 Minnesota and Iowa collection (11/22).

Laura Mol, Virginia Medical Center; **Ross Ogden, Cassidy and Pinkard**, Graduate School, USDA; **Michael Wilpers**, Sackler Gallery, S.I.; Fall DC Woody Plant Identification Class, tour herbarium (11/28).

Jerrold Davis, Cornell University; Poaceae (11/30).

David Mindell, University of Michigan; Collaborative research (11/30-12/1).

Konstantyn Romaschenko, National Academy of Science of Ukraine, Kiev; Stipeae (Poaceae) (11/30-5/30).

Oscar Vargas, Universidad de los Andes, Bogota, Colombia; *Diplostegium* (Asteraceae) (12/9-1/13).

Steve Manchester, Florida Museum of Natural History; *Aralidium* and Rutaceae (12/13-12/16).





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Chair of Botany
Warren L. Wagner
(wagnerw@si.edu)

EDITORIAL STAFF

Editor
Gary Krupnick
(krupnickg@si.edu)

News Contacts
MaryAnn Apicelli, Robert Faden, Ellen Farr, Shirley Maina, Rusty Russell, Alice Tangerini, and Elizabeth Zimmer

The Plant Press is a quarterly publication provided free of charge. If you would like to be added to the mailing list, please contact Dr. Gary Krupnick at: Department of Botany, Smithsonian Institution, PO Box 37012, NMNH MRC-166, Washington, DC 20013-7012, or by E-mail: krupnickg@si.edu.

Web site: <http://www.nmnh.si.edu/botany>

Travel

Pedro Acevedo traveled to Oxford, Ohio (11/1 – 11/3) to present two lectures at Miami University.

Laurence Dorr and Dan Nicolson traveled to Bronx, New York (10/10 – 10/13) to conduct research on *Taxonomic Literature, F & G Supplement* at the New York Botanical Garden.

W. John Kress traveled to St. Louis, Missouri (10/13 – 10/16) to attend the 53rd Annual Systematics Symposium at the Missouri Botanical Garden; and to

Dominica and St. Lucia (12/3 – 12/8) to conduct continued research on *Heliconia* and hummingbirds.

Diane Littler, Barrett Brooks, Don Hurlbert, Barbara Watanabe and Larry Gorenflo (Conservation International), traveled to the island of Bonaire, Netherlands Antilles (11/1 – 11/14) to evaluate the condition and algal flora of the vast reef system.

Rusty Russell traveled to St. Louis, Missouri (10/16 – 10/19) to attend the

A Ten Year Mark

This issue marks the tenth year of the *Plant Press*, and my first "Editor's Note." The Department of Botany has undergone quite a change in those 10 years. We have seen five curators retire, including Dan Nicolson who recently retired last month (page 4 and back page), and two new hires (Jun Wen and Kenneth Wurdack). We also had a change in Chairmanship at the end of 2006, with John Kress stepping down, and Warren Wagner resuming the Chair he once held 9 years ago.

In the newsletter's 10-year history, I have had the honor to be a co-editor for 5 years and the sole editor for the past 2 years. The Department continues to flourish, and I find it exciting to witness the thought-provoking research that our staff produces.

In this issue we report on the progress we have had at contributing to the implementation of the Global Strategy for Plant Conservation (page 1). The Department was a key player in the creation of the Strategy four years ago, and we continue to make strides on several of the 16 Targets.

Collecting trips are the foundation of the U.S. National Herbarium, for it was the large collections of the U.S. South Pacific Exploring Expedition, under the command of Lt. Charles Wilkes, U.S.N., in 1838-1842, which formed the real basis for a national herbarium in 1848. In this issue of the *Plant Press*, we highlight two expeditions, one from the depths of the Caribbean Sea (page 7) and the other from the peaks of the Tibetan mountains (page 8).

The botanical type specimen collection in the U.S. National Herbarium is one of the finest collections in the world, and is highlighted in this issue on several fronts. The Type Specimen Register <<http://ravenel.si.edu/botany/types/>> contains images and data for more than 90,000 type specimens of algae, lichens, bryophytes, ferns, gymnosperms and angiosperms. The type collection continues to expand its reach with the release of a 4-DVD set (page 7). In addition, the Type Register was a feature at a recent conference and fair at the Smithsonian, highlighting efforts to digitize the Institution's vast and varied collections (page 10). The Register will continue to grow and improve as the Andrew W. Mellon Foundation has just awarded a grant to the Department to continue work on digitizing the type collections (*Plant Press* 9(4); 2006).

While it is a bit early, we are also pleased to announce that the next Smithsonian Botanical Symposium will be held on 25-26 April 2008, and will coincide with the opening of the National Museum of Natural History's new hall of coevolution (page 10). The past six symposia have been highly successful at bringing together an international mix of botanists, taxonomists, ecologists, and conservation biologists. With this next installment we look forward to continuing to create an environment of critical thinking and lively discussion.



Gary Krupnick, Editor

Taxonomic Databases Working Group (TDWG) meeting at the Missouri Botanical Garden; and to Atlanta, Georgia (10/19 – 10/20) to visit the Georgia Department of Archives and History for collections research on the Palmer project.

Alice Tangerini traveled to Seattle, Washington (10/25 – 10/29) to attend the annual meeting of the American Society of Botanical Artists.

Alain Touwaide and **Emanuela Appetiti** traveled to Canada (11/3 – 11/12) to attend the annual meeting of the History of Science Society in Vancouver, and to present lectures at the University of Victoria; to Thessaloniki, Greece (11/27 – 12/4) to present the inaugural lecture at the 5th Conference of the Pan-Hellenic Society for the History of Medicine and to conduct research at the Library of the Aristotle, University of Thessaloniki; and to Crete, Greece (12/23 – 1/3) to discuss medicinal plants from Antiquity with colleagues.

Warren Wagner traveled to Portland,

Oregon (10/7 – 10/10) to attend the board meeting of the National Tropical Botanical Garden and to give a public lecture; to St. Louis, Missouri (10/10 – 10/16) to serve on the external review committee for the Missouri Botanical Garden, to participate in the 53rd Annual Systematics Symposium, and to conduct research on Onagraceae; and to London, England (10/30 – 11/6) to participate in a two-day meeting and present the treasurer's report at the Species Plantarum meeting.

Anna Weitzman traveled to St. Louis, Missouri (10/17 – 10/22) to present a talk at the Taxonomic Databases Working Group (TDWG) meeting at the Missouri Botanical Garden; and to London, England (11/8 – 11/16) to work on the "INtegrated Open TAXonomic Access" (INOTAXA) project at the Natural History Museum.

Jun Wen traveled to St. Louis, Missouri (10/13 – 10/16) to present a talk at the 53rd Annual Systematics Symposium at the Missouri Botanical Garden; and to

Taipei, Taiwan (10/31 – 11/8) to conduct research and collect specimens from Taipei to Lanyu.

Elizabeth Zimmer traveled to St. Louis, Missouri (10/13 – 10/16) to attend the 53rd Annual Systematics Symposium at the Missouri Botanical Garden.



Staff Research & Activities

Vicki Funk presented "Enology and Phylogeny: A Botanical Perspective" to the Botanical Society of Washington at their November meeting.

On 1 November, **Gary Krupnick** presented a guest lecture "A Natural History Approach to Plant Conservation" to the public at the Smithsonian Environmental Research Center (SERC) in Edgewater, Maryland.

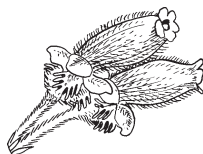
Recently it was realized that the U.S. National Herbarium had the first set of specimens distributed by Merrill around 1916 to represent species published by Blanco in the 1800s. **Dan Nicolson** and former staff member Dawn Arculus published a short paper pointing out that the US specimens of Merrill's were logical candidates for neotypification of Blanco's names (*Taxon* 50: 947-954. 2001) because it was the first set (often with field labels). Nicolson was delighted to see that *Cucumis luzonicus* Blanco was just neotypified (*Blumea* 51: 21. 2006) on the US specimen of Merrill's Species Blancoanae no. 848. The database and images of the US set are available from our public Website at <<http://persoon.si.edu/blanco/>>. The image there lacks the recent annotation labels added while the specimen was on loan.

Alice Tangerini led a workshop entitled "Botanical Illustration: Pen and Ink Techniques" at the U.S. Botanic Garden on 10-12 November. The workshop covered illustration of botanical subjects, from sketch to a finished rendition in black and white using pen and ink.

Alain Touwaide has a 10-panel poster exhibition circulating around the world, entitled "An Odyssey of Knowledge." The exhibition presents the circulation of medical knowledge in the medieval Mediterranean world on the basis of manuscripts and early printed books from the collection of the National Library of Medicine (National Institutes of Health in Bethesda, Maryland). The exhibition was inaugurated in 1984 in Metaponto, Italy,

on the occasion of the Congress of the International Society for the History of Medicine, and has been displayed since in Geneva, Rome, Istanbul, and Mexico. It is now on display at the University of Paris and in November, it will be at the University of Victoria in Canada. It travels to China and London next year.

On 11 December, Touwaide gave a presentation on "Medicinal Plants in Greece and Rome" at George Washington University, College of Arts and Sciences, Department of Classical and Oriental Studies.



Staff Retirements

Dan Nicolson officially retired from the Smithsonian Institution in December. Nicolson, a specialist in Asian botany and botanical nomenclature, had nearly 43 years of federal service in the Department. Only Harold Robinson has been on the staff longer. Nicolson was previously profiled in the *Plant Press* (2(1); 1999). Working with Laurence Dorr, Nicolson is close to finishing the last supplement to Stafleu & Cowan's "Taxonomic Literature" (TL-2) (F-G) with about 800 pages in hand.

New Faces

In January, **Benjamin van Ee** started a Smithsonian postdoctoral fellowship under the sponsorship of **Kenneth Wurdack**. He will be working on poinsettias, a group within the large genus *Euphorbia* (Euphorbiaceae), and including the commonly cultivated Christmas poinsettia, *Euphorbia pulcherrima*. Van Ee's project involves a morphological and taxonomic part that will be carried out in the herbarium and molecular work at the Laboratories of Analytical Biology, along with field work to collect more poinsettias and to observe their pollinators in Mexico. Van Ee was born and raised in the Yucatan peninsula of Mexico. He obtained an undergraduate degree in Environmental Studies from Dordt College in northwest Iowa after which he worked as an assistant

for educational travel programs in the U.S., India, and Kenya. In 2006, Van Ee completed a Ph.D. studying aspects of the phylogenetics, morphological evolution, and biogeography of the large genus *Croton* (Euphorbiaceae) at the University of Wisconsin-Madison under Paul Berry.

Lei Xie began a two-year postdoctoral fellow in January. Working with **Jun Wen** and **Warren Wagner**, he will focus his research on the systematics of *Clematis* (Ranunculaceae) and the *Circaea-Fuchsia* clade (Onagraceae). Xie received his Ph.D. from the Institute of Botany, Chinese Academy of Sciences in Beijing, China. His doctoral thesis was "Taxonomic revision of *Clematis* Sect. *Campanella* Tamura (Ranunculaceae), with a study on the phylogeny of *Clematis* based on pollen morphology."



Awards & Grants

The U.S. Department of Agriculture has awarded grants to **Vicki Funk** (\$18,000) and **Paul Peterson** (\$20,000) to review the taxonomy, nomenclature, and attributes of the Asteraceae (Funk) and Poaceae (Peterson) of the U.S. and its Territories contained within the PLANTS database <<http://plants.usda.gov>>.

Paul Peterson received a grant from the National Geographic Society (NGS) for \$20,600, beginning in FY2007, to support the project, "Phylogeny, Biogeography, and Evolution of the Muhlenbergiinae (Poaceae)." The grant will cover two collection trips, one to Peru and Bolivia and the other to Mexico, and it will also support some of the DNA sequencing fees.

Three Recipients of the 2006 José Cuatrecasas Travel Award Visit USNH

Rodrigo Bernal, from the Instituto de Ciencias Naturales, Universidad Nacional de Colombia (Bogotá, Colombia) visited the U.S. National Herbarium between 15 October and 16 November, in order to study the specimens of Colombian palms (Arecaceae). His main objective was to study relevant collections that might help solve some old-standing taxonomic problems in various genera. Although he identified many specimens in different genera, he concentrated mostly on the genera *Aiphanes*, *Mauritiella*, and *Manicaria*. As a result of his study, he gained a better understanding of particular species complexes in the genus *Aiphanes*, which allowed him to separate several species previously included under other taxa in the recent monograph of the genus for *Flora Neotropica*. As a consequence of his studies he recognized five new taxa in this genus, four of which will be removed from synonymy; the other one will be described as a new species. In the genus *Mauritiella*, the study of collections helped him separate a species previously included in synonymy. In the genus *Manicaria*, the collections available for study at US were not enough for drawing any conclusion about the recognition of a second species in this currently monotypic genus. As a result of Rodrigo's visit, the total number of palm species native to Colombia has increased from 215 to 222, and many new localities and common names were added to the records.



Rodrigo Bernal



Oscar Vargas

In early December, **Oscar Vargas**, a graduate student from the Universidad de los Andes (Bogotá, Colombia), visited the Department for six weeks. Vargas began studying the Colombian members of the large genus *Diplostephium* Kunth in HBK (Asteraceae) more than two years ago when he worked on his bachelor thesis. Now he has broadened his interests and is studying the whole genus, just as Cuatrecasas did years ago, and he has included taxonomy, cladistics, biogeography and molecular systematics of *Diplostephium* in his master's research. During his stay, he studied many specimens of *Diplostephium* and collected data from the collections, the library, and the Cuatrecasas archives. He compiled a complete list of published names and found many non-valid names related to the genus. Vargas annotated 11 type specimens and identified three additional types in the general collection. He also carried out a careful study of the specimens in order to find diagnostic characters to identify each species. These characters were then used to curate the general collection and to identify (or re-identify) 50 specimens. Finally, he put morphological data into a datamatrix, photographed all specimens, and completed some drawings. These data will be used to perform a cladistic analysis, to build an interactive digital key as well as a dichotomous key, and to propose new synonyms. Some of the results of this visit will be published on the *Diplostephium* Webpage <<http://botanica.uniandes.edu.co/diplostephium.htm>>, which is maintained by Vargas.

Alejandra Vasco visited the Department during ten days in October. A graduate student at the New York Botanical Garden, Vasco received the award to support her project "Monograph and Phylogenetic Study of the Fern Genus *Elaphoglossum* Subsection *Muscosa* (Dryopteridaceae)." During her visit, Vasco examined herbarium material from two groups within the genus *Elaphoglossum*: *Elaphoglossum* subsection *Muscosa* (her doctoral dissertation study group), and another small *Elaphoglossum* group (*E. ciliatum*-group). Most *Elaphoglossum* collections in herbaria remain unidentified because many of the species are confusingly similar and no keys exist to identify them. The visit to the US National Herbarium allowed Vasco to revise the folders containing unidentified specimens and find collections that otherwise might not have made it into a normal loan request. Vasco examined the types, the general collection and all the possible folders where the species might have been hiding, as well as the indeterminate collections. For the *Elaphoglossum* subsection *Muscosa* group, specimens of interest were set aside for loan to the New York Botanical Garden. The specimens in the ciliatum-group were identified and annotated.



Alejandra Vasco

A Great Day for Pollinators at Risk

In an unprecedented move to advance a vital conservation cause, three U.S. entities collaborated on 18 October to increase attention to the importance, and potential peril, of pollinating animals and the plants which depend on them for reproduction. At the “Pollinator Symposium”—jointly hosted by the U.S. Department of Agriculture (USDA) Forest Service, the USDA Natural Resources Conservation Service and the North American Pollinator Protection Campaign (NAPPC)—the National Academy of Sciences, USDA and U.S. Postal Service each made major announcements to focus public attention on often unseen and yet vitally important interactions between plants and the pollinating animals that help them reproduce.

The goal of the Pollinator Symposium was to raise awareness and to underscore the critical need for forethought and research to prevent a crisis in the pollinator world. As part of the NAPPC Pollinator Partnership, scientific, environmental and agricultural organizations are working together to avert a global calamity by focusing on sustaining and enhancing pollinators, who in turn play a vital role in a stable food supply and in natural ecosystems. **Gary Krupnick**, NMNH’s representative on NAPPC and a member of NAPPC’s steering committee, served on the symposium’s organizing committee.

Chuck Conner, Deputy Secretary of Agriculture, announced at the Symposium



In the summer, Post Offices will be abuzz with the release of the four-design, 20-stamp *Pollination* booklet. The four designs featured depict: two Morrison’s bumble bees paired with purple, or chaparral, nightshade; a calliope hummingbird sipping from a hummingbird trumpet blossom; a lesser long-nosed bat preparing to “dive” into a saguaro flower; and a Southern dogface butterfly visiting prairie, or common, ironweed. An intricate graphic scheme emphasizes the ecological relationship between pollinators and plants and also hints at the biodiversity necessary to ensure the future viability of that relationship. The four designs are arranged in two alternate blocks that fit together like interlocking puzzles. Above, the flowers are arranged in the center. Below, the pollinators form a central starburst. © 2006 USPS. All Rights Reserved.

that Agriculture Secretary Mike Johanns signed a proclamation in recognition of pollinators and designated June 24-30, 2007, as National Pollinator Week. This action is part of a growing effort by USDA to address pollinator conservation challenges, and lays the groundwork for a national outreach campaign in 2007.

Status of Pollinators: Monitoring and Prevention of their Decline in North America, a nearly 400-page report completed by the Academies’ National Research Council (NRC) was introduced by Gene Robinson, University of Illinois professor of entomology, Academy member and member of the NRC committee formed to conduct the pollinator study.

“This study is the foundation on which all our science and policy for pollinators can be built from now on,” said Robinson. “This thorough compendium shows us not only what we know about pollinators, but also what we need to know.” The report is available at <http://www.nationalacademies.org>.

In a third major development, the U.S. Postal Service unveiled the intricate design for a commemorative stamp series highlighting the interconnectedness of nature and the process of pollination.

“Farmers see the connection between plants and pollinators every day,” said Conner. “Thanks to these beautiful stamps, that same point is illustrated for everyone.” The pollination stamps will be



issued during National Pollinator Week in 2007 as part of NAPPC's planned national pollinator awareness campaign.

The Pollinator Symposium was created by the partners of NAPPC, a tri-national, public-private collaboration of scientific researchers, state and federal agencies, private industry and environmental groups dedicated to ensuring sustainable populations of pollinating animals. More information can be found at <http://www.pollinator.org>.

A Typical DVD Collection

The United States National Herbarium has recently produced a 4-DVD set containing over 85,000 records and 79,000 images of vascular type specimens in the USNH. For plant taxonomists, type specimens are fundamental to understanding the link between a plant species and its published name. These specimens are the physical manifestations of an author's species concept and allow us to revisit the work of earlier scientists as new information and technologies become available for analysis. The USNH has assembled one of the finest collections of plant type

specimens in the world.

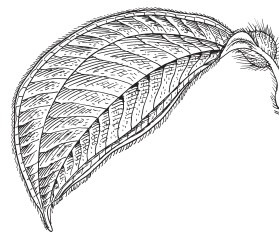
The DVDs were produced in November 2006, and the data and images comprise the largest verified plant type specimen database in the world. The DVD set is most appropriate for those who do not have immediate access to the Web and is available from **W. John Kress** (kressj@si.edu) or **Rusty Russell** (russellr@si.edu). Support for the types image project was provided by the National Science Foundation and the Walcott Fund in the Department of Botany.

For a completely searchable database of vascular type images that is continually updated, please visit the Department's Botanical Type Specimen Register at <http://ravenel.si.edu/botany/types>.

The Vienna Code

The International Code of Botanical Nomenclature (Vienna Code) was mailed to the editors, including **Dan Nicolson**, on 21 September. The Vienna Code contains 568 pages (94 more pages than the St. Louis Code). A glossary (Appendix VII) is just one new feature of the Code. Nicolson has been an editor of the Codes since the 1983 (Sydney). The only person who has been on the Editorial Committee

longer is Vincent Demoulin (from Liège, Belgium), a mycologist who began as editor with the 1978 (Leningrad) Code.

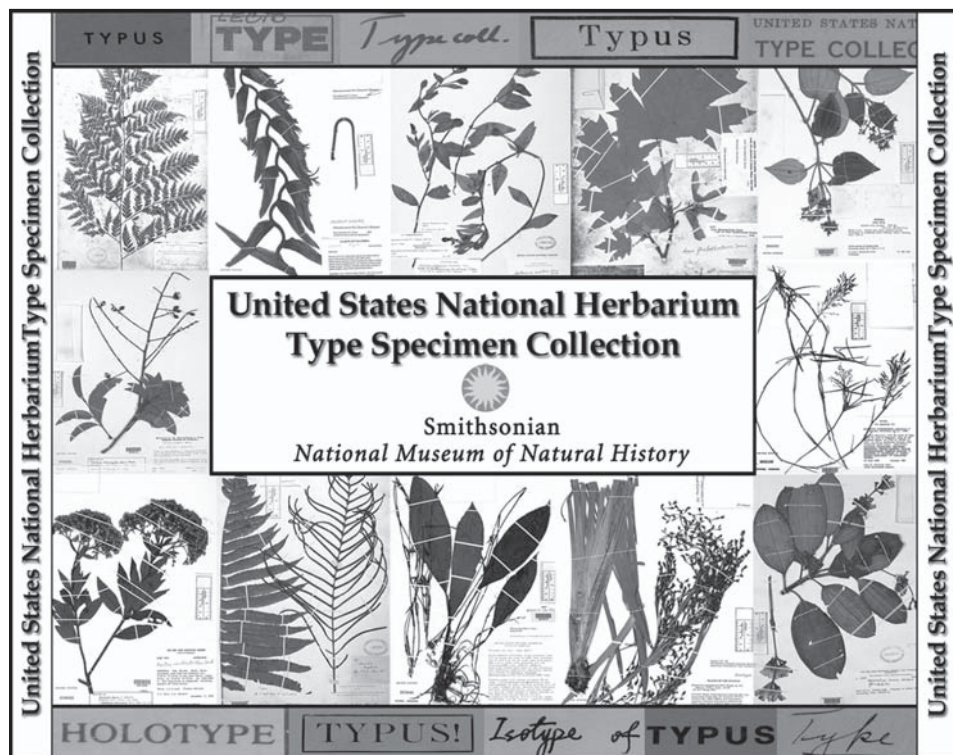


Exploring the Reefs of Bonaire

In early November, **Diane Littler**, **Barrett Brooks**, **Don Hurlbert**, **Barbara Watanabe** and Larry Gorenflo (Conservation International) traveled to the island of Bonaire, Netherlands Antilles to evaluate the algal flora and condition of the vast reef system. The research expedition was sponsored by Conservation International and the Antilles government. The team collected over 300 specimens from the reef wall to a depth of 170 ft. Over 1,000 digital photographs were taken in support of one of the long term project: *Caribbean Reef Plants: First Revision*. They surveyed the health of the reefs using key indicator species in reference to the growing problems associated with eutrophication and overfishing along tropical and subtropical shorelines (the ecological responses of coral and macroalgae to nutrient enrichment and release from predation have been repeatedly cited as priority areas in need of further research).

Bonaire's reefs seemed in excellent shape in respect to fish populations with large numbers of herbivorous fish at nearly all of the 21 sites surveyed. The problem of eutrophication seems to be of paramount importance, however, with the Antilles government and the local population aware of the need to reduce the nutrient load to improve coral recruitment following the last several hurricanes, which destroyed most of the shallow coral populations.

The excess nutrients are a problem for the overall reef dynamics but provided the Littler team with an opportunity to collect the abundant Cyanobacteria (over 70 numbers) in the shallower reef habitats. The deeper reefs were still spectacular with abundant hard corals and gorgonians dominating the seascape.



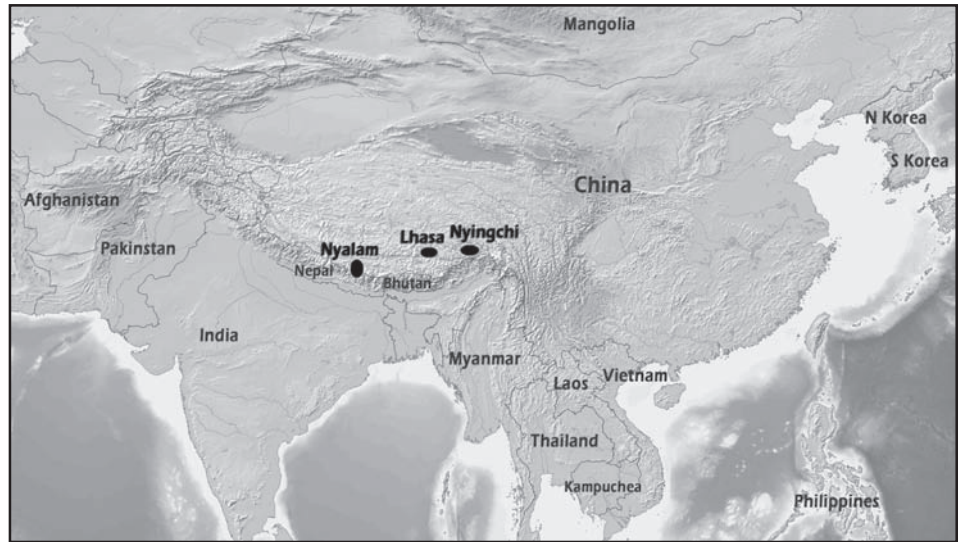
The cover of the 4-DVD set of the U.S. National Herbarium vascular type specimen collection.

Botanical Collecting and Capacity Building in Himalayan Tibet, China

By Jun Wen

The mountains of southern Tibet (Xizang Autonomous Region), China, form the eastern extent of the Himalayan range. Across this rugged landscape, high ridges uplifted from the collision of India with Asia shift from an east-west orientation to run primarily north-south; to the northwest, they give way to the highest plateau on Earth. It is a region of extreme elevational ranges compressed in short distances, with a corresponding diversity of habitats ranging from nearly untouched lowland subtropical forests (with tree ferns) in the Yarlongtsangpo River Valley, to montane tree *Rhododendron* cloud forests, to areas of alpine and cold desert vegetation at the highest elevations.

The flora of southern Tibet is rich and contains many endemic species. However, biodiversity in this region has in general been little studied and poorly documented. Historically this politically sensitive, geographically remote region has received few non-Chinese biologists. A paucity of botanical collections exists in western herbaria, and those tend to be over sixty years old, made primarily by W. Griffith, J. Rock, and F. Kingdon-Ward in the early part of last century. A basic flora



Map of South Asia showing three collection sites in eastern Tibet.

of the Xizang region has been published (*Flora of Xizang*, vols. 1-4; 1983-87), but this is neither intended, nor sufficiently detailed, for conservation purposes.

In terms of biodiversity conservation, southern Tibet is perhaps the most enigmatic region in the Himalaya. The geographic distribution, abundance, habitat needs, and overall conservation

status of most plants and fungi in Tibet have not been studied.

Jun Wen and colleagues Rick Ree and Greg Mueller (Field Museum of Natural History) received a grant from the MacArthur Foundation to collect baseline data on biodiversity in southern Tibet, emphasizing vascular plants and fungi. The project also intends to increase the capacity of young colleagues to conduct biodiversity research and education, with a strong orientation toward floristic conservation. The project is conducted in collaboration with Chinese colleagues in Kunming to build capacity in Tibet for research and conservation. Their primary collaborator in Kunming is Hang Sun, the Deputy Director of the Kunming Institute of Botany (KIB) of the Chinese Academy of Sciences (CAS).

The first expedition occurred in September 2006, with a team consisting of five botanists from the U.S. (Wen, **Vicki Funk**, **Deborah Bell**, Ree and Mueller), three senior botanists from Kunming (Hang Sun, Songgong Wu and Zhekun Zhou), four graduate students from Kunming (Zelong Nie, Ying Meng, Liang, and Jipei Yue), one graduate student Yunjuan Zuo from Beijing, and two Tibetan colleagues, Zhen Yang and Sang Ge, from Xizang Plateau Institute of Biology. The team started the 3-week field trip in late August with a one-day preparation stay in Kunming Institute of



The botanical expedition team, in eastern Tibet on the way from Nyingchi to Lulang: (Back row, L-R) Vicki Funk, Greg Mueller, Rick Ree, Jun Wen, Sugong Wu, Jun-Feng Liang, and Jipei Xue; (Front row, L-R) Zhen Yang, Zelong Nie, Deborah Bell, Yunjuan Zuo, Ying Meng, and Song Ge. (Photo by driver "Turkey")

Botany, the Chinese Academy of Sciences. Then the team set out for Lhasa, Tibet.

The expedition team had four vehicles and collected in three major areas. The first area was around Lhasa within 200 km from Lhasa. The second site was about 400 km east of Lhasa near Nyingchi (Linzi) and Lulang. The third area was in Zham (or Zhangmu) and Nyalam (or Nyelamu), ca. 600 km southwest of Lhasa near the border with Nepal. The team collected about 1000 collection numbers with several duplicates in three major vegetational zones: the dry plateau area near Lhasa, the eastern forest and alpine area near Linzi and Lulang, and the eastern Himalayan forests in Zhangmu and Nyalam. They also collected in transitional zones in the alpine areas between Lhasa and Nyingchi. Several collections were made between Nyalam and Lhasa, where they covered some areas with the Tibetan Steppe floristic area, which represents the eastern end of the Central Asian floristic zone.

The main focus of the project was to collect vascular plants and fungi. These groups play critical roles as primary producers and nutrient recyclers of terrestrial ecosystems, and are thus natural choices for conservation research. The specimens collected as a result of this program are used to develop a research database of the biodiversity of southern Tibet. They also hope the collections will help enrich the small



Saussurea stella in the Lhasa area of Tibet. (Photo by Jun Wen)

local herbarium in Xizang Plateau Institute of Biology, one of the partner institutions in Tibet.

The alpine and subalpine areas near and east of Lhasa were still covered with various flowers in September. It was especially rich in gentians and close relatives, various Asteraceae such as *Saussurea*, Campanulaceae, Apiaceae. The Lulang-Nyingchi area shows the transition between the Himalayan flora and the western Chinese flora. There are lots of *Pedicularis* with short or extremely long floral tubes (e.g., *Pedicularis longiflora*), *Panax bipinnatifidus*, and

many species of *Saxifraga*, *Saussurea*, and *Meconopsis*. The dominant trees are *Pinus griffithii*, *Abies forrestii*, and *Picea likiangiensis*, along with various *Betula* species. The southern area bordering Nepal was typical Himalayan. The Zhangmu-Nyalam area was fascinating in that within 40 km, they crossed several zones from alpine to warm temperate montane forests. In the high Nyalam area, it was dry and alpine; yet in the Zhangmu area it is wet and warm with excellent development of the cloud forests.

Wen's team anticipates that the four-year project will achieve the following: 1) train a group of about 20 highly knowledgeable specialists in various aspects of biodiversity research and management; 2) establish a database of plants and fungi with photographs, drawings, and information about their ecology, habitats, and associated species; 3) make collections of plants and fungi that will assist in further training and research within Tibet; 4) produce a field identification guide of plants, and 5) develop long-term collaboration that will provide benefits to all those involved for years to come. The development of baseline data today and the development of local expertise for the future will be instrumental for the continued existence of that biological heritage for future generations.



Saussurea obvallata (Photo by Jun Wen)



Digitization in the spotlight

Rusty Russell was selected as one of the nine featured speakers at the “Spotlight on Digitization at the Smithsonian” Conference & Fair held 30 October at the Smithsonian Institution. This pan-Institution conference highlighted various projects that involve imaging and digital conversion of Museum collections. Russell covered the 40-year history of data management and digitization in the Department, focusing specifically on the success of the Type Register, and ended with a discussion of challenges facing the Institution as it moves into newer digital technologies. In November, he chaired one of the tracks at a follow-up workshop which developed more specific recommendations for long range planning.

The Department’s Instant Identification System (IIS) was selected as a demonstration project for the digitization conference. The IIS team (**W. John Kress**, Steven Feiner (CU), David Jacobs (UMd), Sean White (CU), **Ellen Farr**, **Ida Lopez**, **Norm Bourg**, **Michael Butts** and **Ingrid Poly-Yin Lin**) presented two

hands-on demonstrations that allowed participants to take a digital photo of a leaf that automatically transferred via WiFi or Bluetooth technology to the *Identifier* notebook computers. Using recognition software developed by collaborators at the Department of Computer Science, Columbia University, and at the Department of Computer Science, University of Maryland, the *Identifier* gives the user a choice of leaf images of taxa that are possible matches. “The Instant Identification System – Plant Exploration and Discovery in the 21st Century” project is funded in part by NSF Grant ITR-03-25867.

Orchids: Take a Walk on the Wild Side

The 13th Annual Orchid Show is now on display at the National Museum of Natural History (NMNH) in the special exhibition gallery off the Museum’s Rotunda. The show is a joint presentation of the Smithsonian Institution Horticulture Division and the U.S. Botanic Gar-

den, hosted by NMNH. The show runs from 27 January through 22 April.

The Museum was involved with developing the exhibit script with Sally Love in the NMNH Office of Exhibits serving as Exhibit Developer, working with museum botanists **Robert Faden**, **W. John Kress**, **Gary Krupnick**, and **Ken Wurdack**, as well as Ted Schultz and Brian Harris from the NMNH Department of Entomology. Over-all responsibility for the exhibit came from the Horticulture Division, working in cooperation with the Office of Exhibits Central.

The exhibit reveals not only the beauty and diversity of orchids, but also focuses on their natural history, evolution, and conservation. This is the first Smithsonian orchid exhibit with major input from Smithsonian scientists, and many of the labels focus on science, particularly those explaining the evolution of orchids and their adaptation to diverse environments.

Visitors follow in the footsteps of Smithsonian researchers from the forest floor up into the tree canopy to learn about orchids in their natural habitats. The exhibition recreates a tropical rainforest bursting with gorgeous orchids and even



25-26 April 2008

NATIONAL MUSEUM OF NATURAL HISTORY

In collaboration with the United States Botanic Garden

In anticipation of the opening of the new hall of coevolution
“Partners in Evolution: Butterflies and Plants,”
the Department of Botany is pleased to announce that
the next Smithsonian Botanical Symposium will
be held 25-26 April 2008 at the
National Museum of Natural History.

Please visit the Symposium Web page at
<http://persoon.si.edu/sbs>
for developing information.



The Purple-throated Carib (*Eulampis jugularis*)
pollinating *Heliconia caribaea*, its primary host
plant in the Eastern Caribbean
[Photo by W.J. Kress]

includes the mock up of a small research station. Orchids are displayed naturalistically rather than submerged in mulch as is typical for such exhibits. Information on orchid ecology, pollination biology, symbioses, evolution, phylogeny and conservation is interspersed on display panels throughout the exhibit. Scientific research at NMNH, Smithsonian Tropical Research Institute (STRI), and Smithsonian Environmental Research Center (SERC) also is mentioned in this wonderful new exhibit.

Botanical Partners Lecture Series

Arthur O. Tucker, Research Professor at Delaware State University, continued the Botanical Partners Lecture Series by presenting "Chemistry and Ethnobotany of Commercial Incense Copals, Copal Blanco, Copal Oro, and Copal Negro, of North America" on 26 October at the United States Botanic Garden (USBG) Conservatory. The Botanical Partners Lecture Series is a collaboration between the Department and USBG, designed to bring together the Washington scientific community interested in botanical studies. Invited speakers have been chosen to attract participants from a broad spectrum of the local community who are interested in the botanical sciences. Informal receptions after the talks were hosted to promote discussion and exchange of ideas. If you have suggestions for future speakers, please contact Gary Krupnick at krupnickg@si.edu.



Profile

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algorithm that runs inventoried specimens through a series of questions to generate a preliminary assessment of the conservation status of each plant species. To date, an assessment of the Gesneriaceae, Heliconiaceae, and the Hawaiian Island flora have been completed. The specimen data obtained from the further inventory of USNH will eventually be combined with the assembled records from the other major international herbaria. Recommendations will then be given to IUCN as it

prepares a final assessment of all known plant species.

In addition, the following publications contribute to this target:

Kvist, L.P., L.E. Skog, J.L. Clark and R.W. Dunn. 2004. The family Gesneriaceae as example for the biological extinction in western Ecuador. *Lyonia* 6(2): 128-151.

Sakai, A.K., W.L. Wagner and L.A. Mehrhoff. 2002. Patterns of endangerment in the Hawaiian flora. *Systematic Biology* 51: 276-302.

Wen, J., P.P. Lowry II and J.C. Zech. 2004. *Osmorhiza bipatriata* (Apiaceae) in Texas: taxonomic status and conservation considerations. *Sida* 21: 501-506.

Zhou, S.L., J.Wen and D.Y. Hong. 2004. Allozyme diversity in *Eleutherococcus senticosus* and *E. brachypus* (Araliaceae) from China and its implications for conservation. *Sida* 21: 993-1007.

Conserving Plant Diversity

Target 4: At least 10 percent of each of the world's ecological regions effectively conserved; and

Target 5: Protection of 50 percent of the most important areas for plant diversity assured

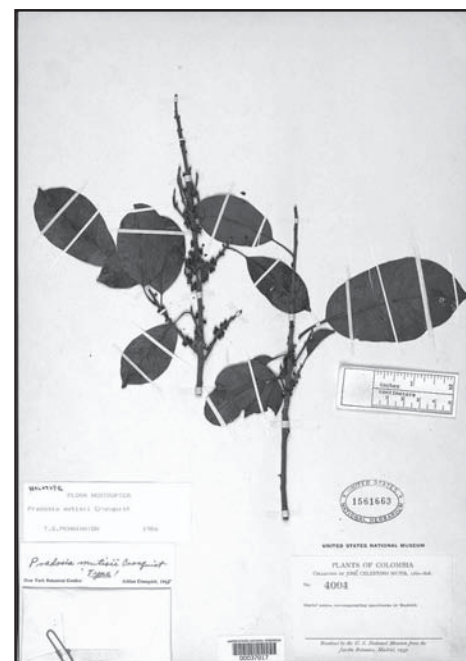
Vicki Funk's group (Biological Diversity of the Guiana Shield Program, BDG) has been operating in north eastern South America since 1983 using species data from herbarium collections (recent and historic) and published floras to identify conservation priority regions. The information gathered has assisted in the designation of protected areas in Guyana where the National Protected Area System (NPAS) is sponsored by the World Bank.

John Kress and his team have worked with the Forestry Department of Myanmar to inventory and assess plant diversity in their national parks and protected areas.

Gary Krupnick has used specimen data and floristic information to assess global biodiversity hotspots in Southeast Asia and the Malay Archipelago.

The following publications also contribute to this target:

Clarke, H.D. and V.A. Funk. 2005. Using checklists and collections data to investigate plant diversity. II. An analy-



The U.S. National Herbarium contains many type specimens of endangered and extinct species. This holotype of *Pradosia mutisii* (Sapotaceae) from Colombia represents a species that is poorly known and has only been described from four collections. It is listed as Extinct in the 2006 IUCN Red List of Threatened Species. © U.S. National Herbarium

sis of five floras from northeastern South America. *Proceedings of the Academy of Natural Sciences of Philadelphia* 154: 29-37.

Funk, V.A., K.S. Richardson and S. Ferrier. 2005. Survey-gap analysis in expeditionary research, where do we go from here? *Biological Journal of the Linnean Society* 85: 549-567.

Kelloff, C.L. 2003. The use of biodiversity data in developing Kaieteur National Park, Guyana for ecotourism and conservation. Pp. 1-44. In: P. DaSilva and V.A. Funk (eds.). *Contributions to the Study of Biological Diversity*. University of Guyana, Georgetown, Guyana.

Kress, W. J., and V. A. Funk. 2005. Herbarium, floras, and checklists. Pp. 209-217. In: G. A. Krupnick and W. J. Kress (eds.). *Plant Conservation: A Natural History Approach*. University of Chicago Press, Chicago and London.

Kress, W. J., R. A. DeFilipps, E. Farr, and Daw Yin Yin Kyi. 2003. A Checklist of the Trees, Shrubs, Herbs and Climbers

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of Myanmar (Revised from the original works by J. H. Lace and H. G. Hundley). *Contrib. U. S. Nat. Herbarium*. 45: 1-590.

Krupnick, G. A. 2005. Hot spots and ecoregions. Pp. 218-223. In: Krupnick, G. A. and W. J. Kress (eds.). *Plant Conservation: A Natural History Approach*. University of Chicago Press, Chicago and London.

Krupnick, G.A., and W.J. Kress. 2003. Hotspots and ecoregions: a test of conservation priorities using taxonomic data. *Biodiversity and Conservation* 12: 2237-2253.

Krupnick, G. A. and W. J. Kress (eds.). 2005. *Plant Conservation: A Natural History Approach*. University of Chicago Press, Chicago and London. 346 pp.

Target 8: 60 percent of threatened plant species in accessible ex situ collections, preferably in the country of origin, and 10 percent of them included in recovery and restoration programs

The Botany Research Greenhouse complex at the Smithsonian's Museum Support Center is a living plant collections facility for the Department. Currently, 1,467 living accessions are maintained in the greenhouses, many of which represent rare and threatened plant species.



Columnnea schimpffii (Gesneriaceae) from Ecuador is part of the living plant collection in the Botany Research Greenhouse complex. The species is listed as Endangered in the 2006 IUCN Red List of Threatened Species. (Photo by Leslie Brothers)

Target 9: 70 percent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained

John Kress has been working with several Latin American institutions on a GEF/WB sponsored project on the "Conservation and Sustainable Use of Neotropical Native Crops and their Wild Relatives."

In order to develop a rapid and reliable system for identifying useful plants to humans, John Kress and post-doctoral fellow David Erickson in collaboration with the U.S. Botanic Garden are developing a DNA barcode library of the world's most widely used medicinal plants.

In 2005, the Department teamed up with the Earthwatch Institute to pursue an extensive effort to database and image ethnobotanical specimens from the Pacific Islands. Under the direction of Rusty Russell and John Kress, the project, titled "Plants and People through the Ages," aims to inventory specimens with label-explicit ethnobotanical data such as common name or use information, ultimately providing a searchable database of the ethnobotanical specimens of USNH.

Vicki Funk arranged for the acquisition of the Brent Berlin ethnobotanical specimen collection documenting the indigenous use of plants in Mexico.

The following publications also contribute to this target:

Liu, A-Z., W.J. Kress and C.-L. Long.

2003. The ethnobotany of *Musella lasiocarpa* (Musaceae), an endemic plant of southwest China. *Economic Botany* 57: 279-281.

Kress, W.J., K.J. Wurdack, E.A. Zimmer, L.A. Weigt and D.H. Janzen. 2005. Use of DNA barcodes to identify flowering plants. *Proc. Nat. Acad. Sci.* 102: 8369-8374.

Cowan, R. S. M. W. Chase, W. J. Kress, and V. Savolainen. 2006. 300,000 species to identify: problems, progress, and prospects in DNA barcoding of land plants. *Taxon* 55: 611-616.

Target 10: Management plans in place for at least 100 major alien species that threaten plants, plant communi-

ties and associated habitats and ecosystems

The following publications contribute to this target:

Poulin, J., A. K. Sakai, S. G. Weller, and W. L. Wagner. 2005. Invasive species. Pp. 176-184. In: Kress, W. J. and G. Krupnick (eds.). *Plant Conservation: A Natural History Approach*. University of Chicago Press, Chicago and London.

Rosen, D.J. and R.B. Faden. 2005. *Gibasis pellucida* (Commelinaceae), a new and potentially weedy genus and species for Texas. *Sida* 21(3): 1931-1934.

Using Plant Diversity Sustainably

Target 11: No species of wild flora endangered by international trade

The Department is involved in two programs that will eventually assist trafficking agents identify endangered plants: plant image recognition technology and plant identification protocols using DNA barcode technology. Plant image recognition software uses shape matching algorithms that can identify specimens by comparing the shape of leaves from an unknown species to the shape of leaves of a digitized species image library. DNA barcode technology, a rapid, cost-effective system, uses short gene sequences taken from a standardized portion of the genome, used to identify species.

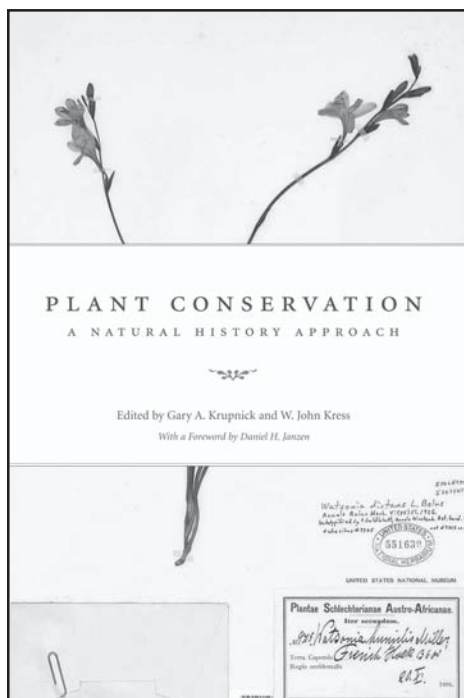
The following publications also contribute to this target:

Agarwal, G., H. Ling, D. Jacobs, S. Shirdhonkar, W.J. Kress, R. Russell, N.A. Bourg, P. Belhumeur, N. Dixit, A. Feiner, D. Mahajan, K. Sunkavalli, R. Ramamoorthi and S. White. 2006.

First steps toward an electronic field guide for plants. *Taxon* 55: 597-610.

Cowan, R. S. M. W. Chase, W. J. Kress, and V. Savolainen. 2006. 300,000 species to identify: problems, progress, and prospects in DNA barcoding of land plants. *Taxon* 55: 611-616.

Kress, W.J., K.J. Wurdack, E.A. Zimmer, L.A. Weigt and D. H. Janzen. 2005. Use of DNA barcodes to identify flowering plants. *Proc. Nat. Acad. Sci.* 102: 8369-8374.



Promoting Education and Awareness About Plant Diversity

Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, educational and public-awareness programs

The importance of plant diversity and the need for its conservation is strongly emphasized in the book *Plant Conservation: A Natural History Approach* (2005, University of Chicago Press), edited by Gary Krupnick and W. John Kress. Natural history has always been the foundation of conservation biology. For centuries, botanists collected specimens in the field to understand plant diversity; now that many habitats are threatened, botanists have turned their focus to conservation, and, increasingly, they look to the collections of museums, herbaria, and botanical gardens for insight on developing informed management programs. *Plant Conservation* explores the value of these collections in light of contemporary biodiversity studies.

No less than 27 scientists from the Smithsonian Institution (24 from the Botany Department) 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 opens with a broad view of plant biodiversity and then

considers evolutionary and taxonomic threats and consequences of habitat alteration; specific threats to plant diversity, such as invasive species and global climate change; consequences of plant population decline at the ecological, evolutionary, and taxonomic levels; and, finally, management strategies that protect plant biodiversity from further decline. With a unique perspective on biodiversity and scientific collections, *Plant Conservation* ultimately emphasizes the role museums and botanical gardens will play in future conservation. The 14 chapters are as follows:

- Chapter 1. Evolution of Land Plant Diversity: Major Innovations and Lineages through Time
- Chapter 2. Diversity and Distribution of Plants (Terrestrial Plant Diversity; Marine Plant Diversity)
- Chapter 3. Plant Extinctions (A Paleontological Perspective on Plant Extinctions; Current Plant Extinctions: Chiaroscuro in Shades of Green)
- Chapter 4. Case Studies in Select Tropical and Subtropical Habitats (The Ecuadorian Andes; The Ramal de Guaramacal in the Venezuelan Andes; The Guiana Shield; Pacific Oceanic Islands; The Gaoligong Mountains of Southwest China and Northeast Myanmar)
- Chapter 5. Case Studies among Select Taxonomic Groups (Dinoflagellates: Phylum Dinoflagellata; Lichens: Phylum Ascomycota; Mosses: Phylum Bryophyta; Grasses: Family Poaceae; Day Flowers: Family Commelinaceae; Acanthus: Family Acanthaceae; Daisies and Sunflowers: Family Asteraceae; African Violets: Family Gesneriaceae; Litchis and Rambutans: Family Sapindaceae)
- Chapter 6. Habitat Fragmentation and Degradation (Forest Fragments and Tropical Plant Reproduction in Amazonian Brazil; Habitat Alteration in the Caribbean: Natural and Human-Induced; Habitat Loss: The Extreme Case of Madagascar; Degradation of Algae in Coral Reefs; Alteration of Kelp Communities in the Northwestern North Atlantic)
- Chapter 7. Invasive Species
- Chapter 8. Global Climate Change: The Spring Temperate Flora
- Chapter 9. Genetic Consequences of

Reduced Diversity: Heterozygosity Loss, Inbreeding Depression, and Effective Population Size

- Chapter 10. Mapping Biological Diversity (Herbarium Collections, Floras, and Checklists; Hot Spots and Ecoregions; Phylogenetic Considerations)
- Chapter 11. Assessing Conservation Status (Genetic Assessment Methods for Plant Conservation Biology; Species Assessment: The IUCN Red List; Community Assessment: Rapid Assessment Teams)
- Chapter 12. Management Strategies (Ex Situ Conservation of Plants; A Proposed Sustainable Coral-Reef Management Model; Application of a Seagrass Management Model)
- Chapter 13. Laws and Treaties: Is the Convention on Biological Diversity Protecting Plant Diversity?
- Chapter 14. Grassroots Conservation
- Conclusion: Documenting and Conserving Plant Diversity in the Future

The Department's Plant Conservation Unit further promotes the conservation of plant diversity by contributing regularly to published newsletters and magazines, including the *Biological Conservation Newsletter (BCN)*, *Plant Press*, and *Plant Talk*. The bibliography of the *BCN*, for instance, includes 29,128 references to literature on conservation biology (from 1983 to the present).

To reach the national and international plant systematics community in a public forum, the Department has been hosting the annual Smithsonian Botanical Symposium since 2001. The Symposium frequently has speakers that address plant conservation, with the 2002 Symposium having the entire focus on the impact of the CBD on scientists.

The following presentations at the Smithsonian Botanical Symposia have addressed issues in plant conservation:

2002 – The Convention on Biological Diversity: The Globalization of Natural History Science

- “Caught Up in the Moment: Botanists and the CBD a Decade After Rio” by Brian M. Boom (Center for Environmental Research and Conservation)
- “The CBD Challenge in Botany: Emerging Responsibilities, Priorities

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- and Practices” by Stella Simiyu (National Museums of Kenya)
- “Linking Science and Policy: The Case of the United Nations Convention on Biological Diversity” by Cristián Samper K. (Smithsonian Tropical Research Institute)
 - “Impact of the Convention on Biological Diversity on Taxonomy and Biodiversity Information” by Scott Miller (National Museum of Natural History)
 - “Access and Discovery of Pharmacologically Active Metabolites from Fungi and Other Microorganisms” by Gerald Bills (Merck Research Laboratories, Spain)
 - “The Convention on Biological Diversity: Challenges and Opportunities in Mainstreaming Biodiversity into Society and Economy” by Bráulio Ferreira de Souza Dias (Brazilian Ministry of the Environment)
 - “Commentary” by Tom Lovejoy (The World Bank)
 - “A Retrospective View of the Rio Convention” by Keynote Speaker, The Hon. Bruce Babbitt (Secretary, U.S. Department of the Interior, 1992-2000)

2003 – Botanical Frontiers in Southeast Asia

- “Conservation in Myanmar: A Tale of Taxonomy in the Golden Land” by

Christen Wemmer (Conservation and Research Center, Smithsonian Institution) and U San Lwin (Institute of Forestry, Yezin, Union of Myanmar)

- “Botanical Diversity in Vietnam: New Discoveries and Challenges in Conservation” by Jack Regalado (Vietnam Botanical Conservation Program, Missouri Botanical Garden) and Nguyen Tien Hiep (National Center for Science and Technology, Hanoi, Vietnam)

2004 – Botanical Progress, Horticultural Innovations, and Cultural Changes

- “Horticulture in a Changing World” by Peter del Tredici (Arnold Arboretum of Harvard University)
- “New Plants for Research and Horticulture: The Problem of Invasive Species” by Dan Hinckley (Heronswood Nursery)
- “Plant Exploration in the 21st Century: Intellectual Property Rights, Globalization, and Technological Tools” by W. John Kress (National Museum of Natural History)

2005 – The Future of Floras: New Frameworks, New Technologies, New Uses

- “Using Computer Vision to Help Biologists Recognize Organisms” by David Jacobs (University of Maryland)
- “DNA Barcoding in Plants: Prospects and Problems” by Vincent Savolainen (Royal Botanic Gardens, Kew)

2006 – Island Archipelagos: Cauldrons of Evolution

- “The Galápagos Islands – Aspects of Vegetation Dynamics and Conservation” by Ole Hamann (Botanic Garden, University of Copenhagen, Denmark)
- “Extinction and Restoration: Oceanic Islands as Testing Grounds for Conservation Biology” by Mike Maunder (Fairchild Tropical Botanic Garden) and Marie M. Bruegmann (U.S. Fish and Wildlife Service Hawaii)

Moreover, the Department organizes and participates in many public lectures on plant conservation each year, such as the quarterly Botanical Partners on the Mall Lecture Series at the U.S. Botanic Garden.

In addition, the following publications contribute to this target:

Bawa, K.S., W.J. Kress, N. Nadkarni and S. Lele. 2004. Beyond paradise - meeting the challenge in tropical biology in the 21st Century. *Biotropica* 36: 437-446.

Bawa, K.S., W.J. Kress, N.M. Nadkarni, S. Lele, P.H. Raven, D.H. Janzen, A.E. Lugo, P. Ashton and T.E. Lovejoy. 2004. Tropical ecosystems into the 21st century. *Science* 306: 227-228.

Kress, W. J., J. D. O'Connor, and P. DePriest. 2002. The globalization of nature. *Science* 296: 1612.

Krupnick, G.A. and W.J. Kress (eds.). 2005. *Plant Conservation: A Natural History Approach*. University of Chicago Press, Chicago and London. 346 pp.

Miller, S. E., W. J. Kress, and C. Samper K. 2004. Crisis for biodiversity collections. *Science* 303: 310.

Shetler, S. 2003. Native plant societies and grassroots conservation. *Wildflower* 19(2): 42-44.

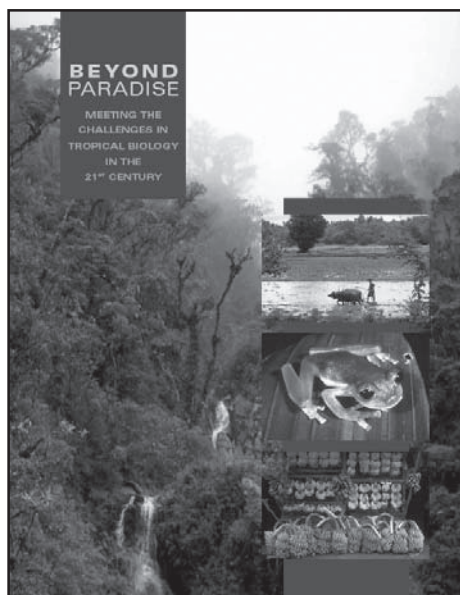
Building Capacity for the Conservation of Plant Diversity

Target 15: The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy

Using formal workshops and informal field training opportunities, the Department has educated botanists, students, and volunteers in field techniques (collecting, identifying, inventory, and surveying) and



The speakers at the 2002 Smithsonian Botanical Symposium “The Convention on Biological Diversity: The Globalization of Natural History Science.” From left, Ira Rubinoff, Brian Boom, Scott Miller, Tom Lovejoy, Gerald Bills, Stella Simiyu, Bráulio Ferreira de Souza Dias, Paula DePriest, Cristian Samper K., and W. John Kress. (Photo by Leslie Brothers)



herbarium techniques (specimen preservation and mounting) in the following countries: Argentina, Canada, China, Guyana, Mexico, Mongolia, Myanmar, Peru, Thailand, United States, and Venezuela.

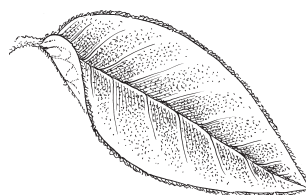
Target 16: Networks for plant conservation activities established or strengthened at national, regional and international levels

The Plant Conservation Unit coordinates activities and research in the Department that focus on plant conservation and endangered plant species. One primary objective of the unit is to promote awareness about plant conservation. The Unit works closely with non-governmental and governmental organizations in the nation's capitol. In this capacity, the Department is affiliated with the North American Pollinator Protection Campaign (NAPPC) and with the Plant Conservation Alliance (PCA).

NAPPC is a consortium of more than 90 affiliated organizations, working to implement, promote and support a clear, continent-wide coordinated action plan to coordinate projects in the areas of pollinator research, education and awareness, conservation and restoration, policies and practices, and special partnership initiatives; to facilitate communication among stakeholders, build strategic coalitions, and leverage existing resources; and to demonstrate a positive measurable impact on the populations and health of pollinating animals. Since its founding, NAPPC has been instrumental in focusing

attention on the plight of pollinators and the need to protect them and their host plants throughout the tri-national region comprised of the U.S., Canada, and Mexico. The Department has hosted the 2004 and 2005 annual meetings of NAPPC at the Smithsonian Institution.

PCA is a consortium of ten federal government member agencies and over 257 non-federal cooperators representing various disciplines within the conservation field. PCA works collectively to solve the problems of native plant extinction and native habitat restoration. PCA, a public-private partnership, also serves as a forum for the exchange of ideas, expertise and information between public and private organizations engaged in habitat restoration and preservation. These exchanges take place in various forms of public outreach, including e-mail lists, postal mailings, a Web site, and bi-monthly meetings in Washington, DC.



Publications

Alexander, S.N. 2006. Review of: *Demons in Eden: the Paradox of Plant Diversity* by Jonathan Silvertown. *Science* 314: 763.

Finot, V.L., **P.M. Peterson** and F.O. Zuloaga. 2006. Two new combinations in *Peyritschia* (Poaceae: Pooideae: Aveninae). *Sida* 22(2): 895-903.

Givens, J.A., K.M. Reeds and **A. Touwaide**, eds. 2006. *Visualizing Medieval Medicine and Natural History, 1200-1500*. Ashgate, Aldershot. 278 pp.

Herrera Arrieta, Y. and **P.M. Peterson**. 2007. *Muhlenbergia* (Poaceae) de Chihuahua, Mexico. *Sida, Bot. Misc.* 29: 1-109.

Ickert-Bond, A. and **J. Wen**. 2006. Phylogeny and biogeography of Altingiaceae: evidence from combined analysis of five non-coding chloroplast regions. *Mol. Phylogenet. Evol.* 39: 512-528.

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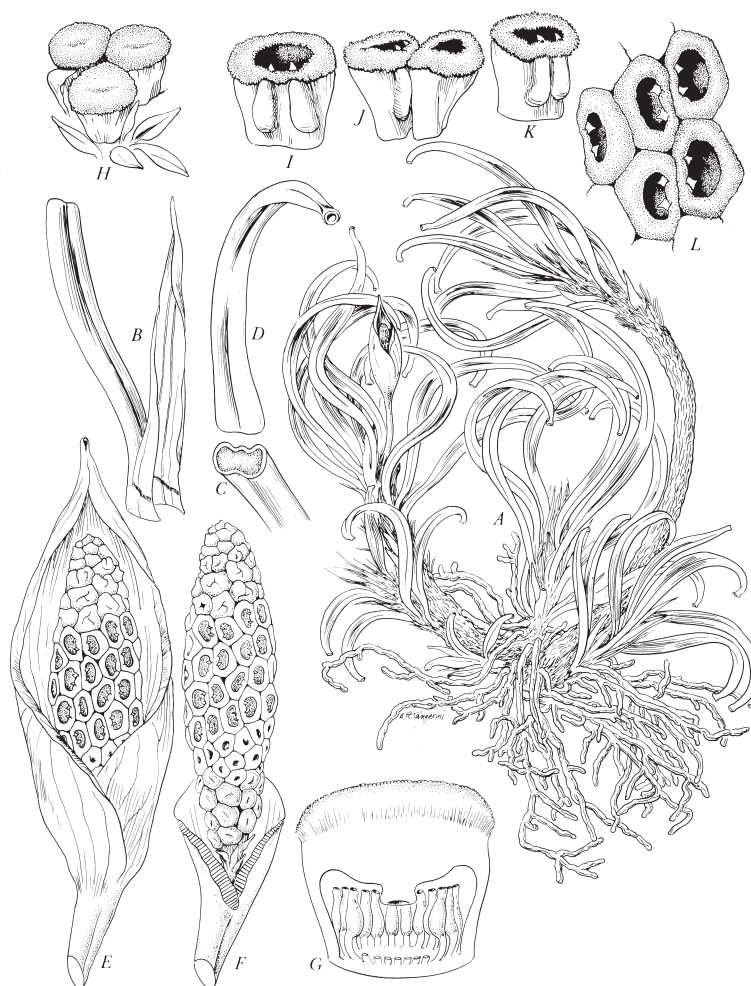
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Art by Alice Tangerini

***Aridarum caulescens* M. Hotta var. *angustifolium* Bogner & Nicolson**

After just short of 43 years in the Department, Dan Nicolson officially retired in December 2006. Nicolson published nearly 250 papers, including four books, and is working (with L.J. Dorr) on the last Supplement (F-G) of *Taxonomic Literature*. This illustration

(from *Willendowia* 21: 43. 1991, with a revised classification of Araceae) is of an unusually small and narrow-leaved aroid, *Aridarum caulescens* var. *angustifolium*, the leaves being about 2.5 cm (= 1 inch) long and 0.25 cm (= 1/8th inch) wide. A rheophyte, this species roots on stones in fast-moving waters of Bornean forests. Note the deeply excavated filaments of the male flowers (top center and top right) and the positions of their horned thecae.



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Department of Botany
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NMNH, MRC-166
Washington DC 20013-7012

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