Department of Botany & the U.S. National Herbarium

The Plant Press

Smithsonian
National Museum of Natural History

New Series – Vol. 9 – No. 1 January–March 2006

Botany Profile

Botanist Taps Rubber Relationships

By Gary A. Krupnick

In September 2005, Kenneth J. Wurdack joined the Department as Research Scientist and Assistant Curator of Botany. As the second new curator hired in 13 years, he joins the Department just a month after Jun Wen (see *Plant Press*, vol. 8, no. 4; 2005). His research interest is mainly the systematics and evolution of the rubber family, Euphorbiaceae, in the broad sense (sensu lato), but also the order Malpighiales (to which euphorbs belong), Thymelaeaceae, horizontal gene transfer, and ant-plant interactions. In what is perhaps the first occurrence in the Department, a curator's offspring has been hired as a curator. Wurdack is the son of John J. Wurdack (1921-1998), Melastomataceae specialist in the Department for 38 years.

Born locally in Washington, D.C. to two botanists (his mother was a plant physiologist by training), Wurdack was immersed in botany from the beginning but turned to it rather late as a career. He received his B.S. in Biochemistry from the University of Maryland, College Park in 1990. He started graduate work at the University of North Carolina at Chapel Hill in the lab of Mark W. Chase and received his M.S. in Biology in 1994. After a two-year hiatus and the relocation of Chase to the Jodrell Laboratory at the Royal Botanic Gardens, Kew, Wurdack returned to UNC to continue graduate studies under Clifford R. Parks and William Dickison, receiving his Ph.D. in 2002. His doctoral dissertation focused on the molecular systematics and evolution of Euphorbiaceae.

Wurdack has a long history associated with the Department. In addition to roaming the halls when he was a child, he was a formal volunteer from 1985 to 1990. During his final years as a graduate student (2000-2002), he worked as the Laboratory Manager in the Cullman Program for Molecular Systematic Studies at the New York Botanical Garden. He then returned to the Smithsonian Institution where he held a postdoctoral fellow position in the Department of Botany and the Laboratories of Analytical Biology for a year, and after that, with support from the National Science Foundation, continued his research at the Smithsonian as a Visiting Scientist and a Research Associate.

The scope of Wurdack's work spans a wide range of taxonomic levels to address questions on the biology, evolution, systematics, and classification of Euphorbiaceae and to integrate them within a phylogenetic framework. As broadly and traditionally circumscribed, the Euphorbiaceae include ca. 336 genera and 8,000-9,000 species. They have been subject to a dizzying array of complex classifications and 20 proposed family-level segregates. The family has developed the reputation of being taxonomically "difficult" and consequently until recently has attracted few specialists. The group is best known as a source of important economic products including natural rubber (*Hevea brasiliensis*), cassava (*Manihot esculenta*), poinsettias (*Euphorbia pulcherrima*), wax (*Euphorbia* spp.), and oils (i.e., *Vernicia* spp., *Ricinus communis*) and has notoriety for the toxin ricin (*Ricinus*). Wurdack's original interest in Euphorbiaceae was inspired by the late Grady Webster (1927-2005), the preeminent and most influential euphorb specialist of the past century.

DNA studies are rewriting Euphorbiaceae systematics. Molecular data have shown that the family is polyphyletic and contains seven lineages (*Centroplacus*, Euphorbiaceae s.s., Pandaceae, *Paradrypetes*, Phyllanthaceae, Picrodendraceae, Putranjivaceae). These lineages are still more or less closely related within the order Malpighiales and Wurdack has broadened his research to span the entire order to more fully understand relationships and evolutionary trends of all the euphorbs and their sister groups. Presently, in collaboration with Charles C. Davis (Harvard University), this work includes 165 taxa, 8 genes and 14,000 bases of aligned DNA sequence data. These broad-scale phylogenies have revealed the relationships of two enigmatic genera, *Paradrypetes* (now a member of the mangrove family Rhizophoraceae and not a primitive Picrodendraceae as previously thought) and African *Centroplacus* recently placed in its own family Centroplacaceae. Wurdack presented this work in July 2005 as a keynote speaker at the International Botanical Congress in Vienna, Austria. His work on the systematics of Euphorbiaceae at lower ranks includes the first generic-level phylogenies for each of the

Continued on page 12

Travel

Robert Faden traveled to Tifton, Georgia (11/28 – 11/30) to present a talk at the Tropical Spiderwort Symposium at the University of Georgia, Tifton.

Maria Faust traveled to Pacific Grove, California (10/2 – 10/8) to present a paper at the 3rd U.S. Harmful Bloom Conference at the Asilomar conference grounds.

Vicki Funk traveled to Panama City, Panama (10/20 – 10/23) to present a paper at the plenary meeting of the Biodiversity Science and Education Initiative; and to St. Louis, Missouri (12/6 – 12/8) to work on the Asteraceae in the herbarium at the Missouri Botanical Garden.

W. John Kress traveled to Miami, Florida (10/10 – 10/12) to attend a meeting of the IUCN Species Survival Commission; to Dublin, Ireland, and London, England (10/21 – 10/27) with **Gary Krupnick** to attend the Global Partnership for Plant Conservation Conference at the National Botanic Gardens of Ireland, Glasnevin, and to attend a business meeting of *Plant Talk* magazine at the Royal Botanic Gardens Kew; and to Dominica (12/5 – 12/13) with **Michael Bordelon**, **Vinita Gowda**, and **Ida Lopez** to conduct research on *Heliconia* and hummingbirds.

Mark Littler and **Diane Littler** traveled to Ft. Pierce, Florida (12/15 – 2/16) to conduct on-going research at the Smithsonian Marine Station and Saba Island.

Dan Nicolson traveled to Kansas City, Missouri (12/5 – 12/7) to inspect a gift of books about early botany donated by Mrs. Stannard of Lawrence, Kansas.

Rusty Russell traveled to Cambridge, Massachusetts (10/11; 11/2 – 11/9) to attend a memorial for Mike Canoso, to meet with the librarian of the Harvard Botany Library about digitizing early reports of the U.S. Exploring Expedition, to present a poster at the 2005 Earthwatch Conference, and to conduct research on the U.S. Ex. Ex. plant collections.

Alain Touwaide traveled to Worcester, Massachusetts (10/21 – 10/23) to present a talk at the New England Medieval Conference; to Barcelona, Spain (11/4 – 11/5) to deliver a talk at the Mediterranean Editors and Translators meeting at the Istituto Europeo de Estudios Mediterraneos; to Philadelphia, Pennsylvania (11/17) to speak at the annual meeting of the American Schools of Oriental Research; and to Rome, Italy (11/24 – 12/9) to conduct research at the National Library of Rome and at the Library of the Botanic Garden of Padua, and to deliver a talk at the Institute for the History of Medicine of Padua University.

Warren Wagner traveled to St. Louis, Missouri (10/7 – 10/14) to attend the Missouri Botanical Garden Systematics Symposium and to conduct Onagraceae research; and to Bronx, New York (10/27 – 10/28) to attend the Science Advisory Committee meeting of the New York Botanical Garden.

Jun Wen traveled to Lima, Peru (11/7 – 12/10) to conduct *Nolana* field work throughout the country.

Kenneth Wurdack traveled to St. Louis, Missouri (10/3 – 10/6) to conduct Euphorbiaceae research at the Missouri Botanical Garden.

Elizabeth Zimmer traveled to Cambridge, Massachusetts (10/17 – 11/5) to conduct collaborative research at Harvard University.

The Plant Press

New Series - Vol. 9 - No. 1

Chair of Botany
W. John Kress
(kressj@si.edu)

EDITORIAL STAFF

Editor
Gary Krupnick
(krupnickg@si.edu)

News Contacts
MaryAnn Apicelli, Robert Faden, Ellen Farr, George 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

Visitors

Alejandro Quintanar-Sanchez, Real Jardín Botánico, Spain; subcosmopolitan *Koeleria* (Poaceae) (9/6-11/24).

Akiko Soejima, Osaka Prefecture University, Japan; Vitaceae (9/28-3/25).

Francisco Cabezas Fuentes, Real Jardin Botanico de Madrid; *Palisot*a (Commelinaceae) (10/7-10/24).

Ze-Long Nie, Kunming Institute of Botany, Chinese Academy of Sciences; Eastern Himalayan conservation and biodiversity, and molecular biogeography of Northern Hemisphere disjunct plants (10/10-6/9).

Mauricio Diazgranados, Herbario Pontificia Universidad Javeriana, Bogotá, Colombia; Cuatrecasas specimens and archives (10/17-2/15).

Isabel Martinez-Ferrando, Independent researcher; volunteer interview (10/17).

Annette Olsen, United States Geological Survey; image storage (10/18).

Leigh Johnson, Brigham Young University; *Navarretia* and *Collomia* (10/20-10/21).

Walter Holmes, Baylor University; Central and South American *Mikania* (Asteraceae) (10/21-10/28).

Vernie Sagun, Illinois Natural History Survey; Flora Malesiana *Acalypha* (Euphorbiaceae) (10/25-10/27).

Clara Inez Orozco, Universidad Nacional de Colombia; Brunelliaceae and Solanaceae (10/26-10/28).

Stephen Blackmore, Royal Botanic Garden Edinburgh; Compositae pollen (11/2-11/6).

John Skvarla, Oklahoma University; Compositae pollen (11/2-11/6).

Alexandra Wortley, Royal Botanic Garden Edinburgh; Compositae pollen (11/2-11/6).

Continued on page 10

Science on a Roll

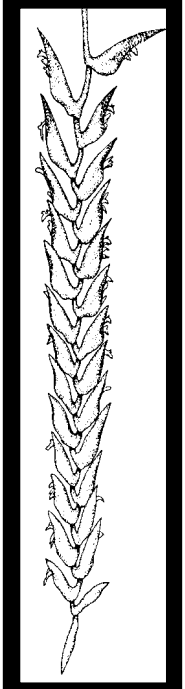
Our conclusion today is that it is unconstitutional to teach Intelligent Design as an alternative to evolution in a public school science classroom." So concludes the Memorandum Opinion issued by Judge John E. Jones III on 20 December 2005 in the Tammy Kitzmiller, et al. (Plaintiffs) v. Dover Area School District, et al. (Defendants) court battle over teaching creationism in the schools.

When I changed my major from philosophy to biology as an undergraduate at Harvard, I never expected that thirty years later as Chairman of Botany at the world's largest natural history museum I would be confronting the same debate that had taken place in my own mind as a student. When I changed majors I decided to pursue a career that would allow me to explore the natural world and the origin of life from a scientific perspective rather than one based on belief and philosophical evaluation. These two approaches to understanding the world were both valid, but separate avenues of inquiry. My time discussing with other philosophy majors questions such as "What is the purpose of life?" and "How do we know?" came to an end. I fled to the biology labs to answer the same questions, but this time using the scientific method to understand evolution. I have continued to this day with that line of inquiry.

In his 139-page ruling, Judge Jones lays out the difference between science and religion and wisely points out that the two can exist side-by-side without conflict. Some would respond that creationism is a legitimate response by religious fundamentalists to their perceived attack by scientific materialism, as exemplified by the theory of evolution, on a belief-based society. However, Judge Jones reasoned that religious beliefs are not acceptable as scientific alternatives to well established scientific theories. In the case of the Dover area schools in Pennsylvania, the Court ruled that Intelligent Design (ID), as a religious belief, was not appropriate in the science curriculum. In fact the ID policy was in violation of the Establishment Clause of the First Amendment of the U.S. Constitution ("Congress shall make no law respecting an establishment of religion…") and also failed the "Endorsement Test" ("Government shows religious favoritism or sponsorship"). The main body of the Jones' Opinion is devoted to how the ID policy failed the Endorsement Test. He addresses four central questions: (1) Would an objective observer know that ID is a form of creationism? (2) Would an objective student view the ID statement as an Official Endorsement of Religion? (3) Would an objective citizen view the ID statement as an Official Endorsement of Religion? (4) Is ID science? As evolutionary biologists, we should find the Judge's comments informative and encouraging, especially with regards to the last argument: Is ID science?

"While ID arguments may be true," states Judge Jones, "ID is not science." It fails to be science on three levels. First ID violates the ground rules of science established in the 16th and 17th centuries by invoking and permitting supernatural causation. Or as Doug Erwin in the Department of Paleobiology stated "Science doesn't do miracles." Second, the ID argument of "irreducible complexity" employs the flawed, illogical and contrived dualism of creation science, i.e., "to the extent that evolutionary theory is discredited, ID is confirmed." Irreducible complexity becomes a negative argument against evolution, not a proof of ID. And third, ID's negative attack on evolution has been refuted by the entire scientific community. For Judge Jones, this last test is perhaps the most important: not a single scientific society has endorsed ID and no scientific papers supporting ID have been published in peer-reviewed journals. Judge Jones concludes that "The goal of the Intelligent Design Movement is not to encourage critical thought, but to foment a revolution which would supplant evolutionary theory with ID."

The Memorandum Opinion by Judge Jones should be read by everyone interested in the debate over teaching Intelligent Design in our schools and the presentation of the theory of evolution in educational institutions such as the Smithsonian Institution. The Judge's arguments are well balanced with detailed background on the issues. His most important conclusion is the affirmation of the distinction between science and religion. I recognized that distinction back as an undergraduate when I moved my major from the Department of Philosophy to the Department of Biology. As scientists we need to maintain an open mind on belief and facts, spirit and materialism, while keeping a firm distinction between religion and science. Yet even more disconcerting than the science versus belief discussion is the increasing fuzziness in today's society between fiction and non-fiction, between recognizing fact from fantasy. The number one book in the non-fiction category of the New York Times Best Seller List is an autobiography that has now been shown for the most part to be made-up and fictionalized by the author, i.e. it is not fact but fiction. So what is real? Our job as scientists in a scientific institution is to present and interpret for the public the facts about the natural world. This job seems to be increasingly difficult.



Chair With A View — W. John Kress

Staff Research & Activities

Robert Faden attended a meeting in Tifton, Georgia on a naturalized species of dayflower that has become a significant agricultural weed in the southern U.S. in recent years. The meeting, "Symposium on Tropical Spiderwort (*Commelina benghalensis*): An Exotic Invasive Weed in the Southeast US", was held on 29 November at the Conference Center of the University of Georgia, Tifton. Faden's talk was entitled "Natural Variation in *Commelina benghalensis* (Commelinaceae)." *Commelina benghalensis*, a native of the Old World tropics, has been a weed in the southeastern U.S. for more than 70 years, but it did not become a serious agricultural pest until after Roundup (a chemical herbicide) resistant cotton was introduced into Georgia in 1998. By 2000 it had become the most serious weed in cotton in a small area of southern Georgia, and since then it has spread to more than 30 counties in the state. *Commelina benghalensis* has become invasive for a variety of reasons, including its own resistance to Roundup, which became the herbicide of choice after the new, genetically modified cotton was introduced. Its spread has been explosive and it can only be controlled by the use of other herbicides at increased expense to the farmers. It has not been determined how large an area in the U.S. is under threat, but the plant was recorded from North Carolina for the first time in 2002, and it has been reported from South Carolina and Alabama as well.

Faden also gave a talk to the Four Seasons Garden Club on 16 November at a private home in Washington, DC. The talk was entitled "A Plant-collecting Expedition to Southern Tanzania."

On October 20, **Vicki Funk** traveled to Panama to attend the first meeting of the Biodiversity Science and Education Initiative, a project organized by Under Secretary for Science Dave Evans and Stephen Hubbel. Funk is serving on Task Force 1, which is asked to answer the questions "What do we know about biological diversity?" and "How do we fill the gaps?"

Because of the critical role that pollinators play in nature, over 100 international scientists, educators, and business leaders met at the Smithsonian Institution's National Zoological Park on 20-21 October to develop strategies aimed at protecting pollinating species. Collectively known at the North American Pollinator Protection Campaign (NAPPC), this year the consortium assembled to deploy task forces to undertake short-term activities (e.g., bee importation issues, development of educational programs, creation of a pollinator conservation digital library), and to assemble advisory committees to brainstorm issues to be considered in the formulation of future task forces. **Gary Krupnick**, a member of the NAPPC Steering Committee, helped organize the meeting.

Vinita Gowda (left), Ida Lopez, and Michael Bordelon put finishing touches on an experimental *Heliconia* garden in Dominica.

W. John Kress, with **Ida Lopez**, **Vinita Gowda**, and **Michael Bordelon**, spent 10 days in Dominica setting up an experimental *Heliconia* garden. They established nearly 70 30-gallon pots of various forms of *Heliconia* in an enclosed shade house to conduct experiments on hummingbird behavior as pollinators of these plants. This research was supported by trust funds from the Under Secretary for Sciences at the Smithsonian Institution.

On 3 October, **Alain Touwaide** and **Emanuela Appetiti** opened the Web site "*Renaissance Herbals* / *Plantarum Aetatis Novae Tabulae* – A Smithsonian Institution Libraries Digital Collection" at the National Library of Rome in Italy. During the program, Touwaide gave a demonstration of the Web site, which is not yet available to the public, but will be in the near future.

From 7 November to 2 December, **Jun Wen** traveled throughout Peru for field studies on *Nolana* (Solanaceae), Araliaceae, Vitaceae, and *Prunus* (Rosaceae). Some herbarium studies were done in Lima, Oxapampa and Arequipa. The trip was very fruitful with about 10 species discovered from Peru.

Awards & Grants

Rusty Russell and **W. John Kress** received a grant from The Earthwatch Institute for "Plants and People: Extracting Ethnobotanical Data from Historic Specimens," to begin work on collecting ethnobotanical information from specimens from the US National Herbarium. Three teams of Earthwatch participants will visit NMNH during 2006 to work on this project.

Russell also received a grant from the Smithsonian Center for Latino Initiatives. This is the second year of funding for the project "Ethnobotanical Diversity in the

Border Regions of U.S. and Mexico." Funds will allow continued study of plant and ethnographic collections made by Edward Palmer from 1869-1911, the Mexican Boundary Survey of 1849-1855, and the International Boundary Commission of 1892-1894.

Alain Touwaide has been appointed General Secretary of the International Society for the History of Medicine.

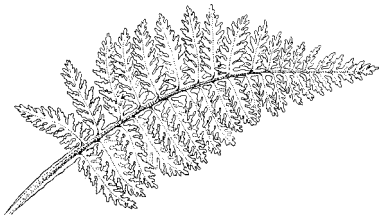
Jun Wen received a grant from the National Science Foundation for her collaborative work with Mike Dillon (the Field Museum of Natural History) for "Phylogenetic Systematics of *Nolana* (Solanaceae) and Biogeographic Implications for the Atacama and Peruvian Deserts."

Global Partnership for Plant Conservation

The Global Partnership for Plant Conservation (GPPC), established to support the worldwide implementation of the Global Strategy for Plant Conservation (GSPC), held its first conference "Plants 2010" at the National Botanic Gardens in Dublin from 22 - 25 October. **Cristián Samper** presented the keynote address, "The Challenge of Implementing the GSPC a National and Regional Levels." The GPPC is composed of 20 member organizations, including the National Museum of Natural History. **W. John Kress** and **Gary Krupnick** represented the Department at the meeting.

The Global Strategy was adopted by the Conference of the Parties of the Convention on Biological Diversity (CBD) in April 2002, with the long-term objective of halting the current and continuing loss of plant diversity. The most innovative element of the Strategy is the inclusion of 16 broad outcome-oriented targets, aimed at achieving a series of measurable goals by 2010. After the GPPC conference, Kress and Krupnick attended the *Plant Talk* editorial board meeting at the Royal Botanic Gardens Kew in London, UK. The Department is a sponsoring partner of *Plant Talk*, a magazine that provides information, encouragement, and advice on global plant conservation, supporting the GSPC by addressing Target 14, which covers the promotion of education and public awareness about plant diversity.

Kress was recently appointed to the Plant Conservation Committee of the IUCN Species Survival Commission. The Committee consists of botanical experts from around the world that work together to provide a plan for conserving plants and their habitats. In particular, the Committee will address the completion of the conservation assessment of all species of vascular plants as well as *in situ* conservation measures. One outcome of the meeting is that Kress and Krupnick will work in partnership with IUCN and other key botanical institutions around the world (e.g., Royal Botanic Gardens Kew, Royal Botanic Garden Edinburgh, Missouri Botanical Garden) on Target 2 of the GSPC, which is to assign preliminary global level assessments of the conservation status of all known plant species by 2010.



Smithsonian Contributions to Botany on the Web

The Smithsonian Institution Libraries have digitized the complete *Smithsonian Contributions to Botany* series (vols. 1-91; 1969-2001), and have made all volumes available on-line as single large-file pdfs or small-file pdfs at <http://www.sil.si.edu/smithsoniancontributions/

Botany/>. The Web page allows the user to navigate the series via title, volume number, or issue date. One can also select an individual volume, search for a title, or search for an author.

The *Smithsonian Contributions to Botany* series reports on the scientific, technical, and historical research conducted by Smithsonian staff and their professional colleagues, as well as on the collections of the various Smithsonian museums.

The emphasis upon publications as a means of diffusing knowledge was expressed by the first Secretary of the Smithsonian Institution. In his formal plan for the Institution, Joseph Henry articulated a program that included the following statement: "It is proposed to publish a series of reports, giving an account of the new discoveries in science, and of the changes made from year to year in all branches of knowledge not strictly professional."

The digitization project is part of a larger effort to digitize all Smithsonian Institution publication series (see http://www.sil.si.edu/smithsoniancontributions/). Even though only the *Botany* series is listed at this point, authors and titles are searchable for all SI series: Anthropology; Paleobiology; Earth Sciences; Marine Sciences; Zoology; Folklife Studies; Air and Space; and History and Technology.

As previously reported (see *Plant Press*, vol. 7, no. 4; 2004), the *Contributions from the United States National Herbarium* series also has selected volumes available on-line (see http://www.nmnh.si edu/botany/pubs/CUSNH/).

A Copenhagen-Smithsonian Expedition to Ethiopia

Gregory McKee, Department technician and former assistant to retired curator of ferns David Lellinger, participated on a fern collecting expedition to Ethiopia. McKee was partially funded by a small grant from the Office of the Director, National Museum of Natural History, to curator **Robert Faden**, who was unable to travel at the time. As a result of McKee's field work 173 collections will be added to the U.S. National Herbarium. The fern collections at US are the largest in the United States and one of the largest such collections in the world. The new collections from Ethiopia will be a significant addition to the African fern holdings. The following is McKee's account of the trip.

Between August 22 and September 23, the University of Copenhagen sent an expedition to Ethiopia for the purpose of collecting ferns for the *Flora of Ethiopia and Eritrea.* McKee accompanied the expedition leader, Professor Ib Friis (University of Copenhagen Museum), assistant Assefa Hailu (University of Addis Ababa Herbarium), and driver Berhanu Yitbara during the trip.

After a day in Addis Ababa gathering supplies, the expedition headed southwest to the town of Ambo (famous as the site of Emperor Haile Selassie's favorite resort) which was used as a base for the next few days while collections were made in the nearby Tchelimu forest. The next leg of the trip was collecting along the way to the town of Nekemt, going from ca. 2,800 meters to 1,650 meters, making a few lowland collections.

The next few days saw a number of collections from the wet valleys of the surrounding rivers and swamps, but the greatest diversity came from the southwestern part of the mountains near the coffee town of Teppe. These forests consisted of tall canopy trees with wild Arabica coffee (*Coffea arabica*) understory. One side trip brought the expedition to a wonderful tall bamboo forest draped with *Canarina abyssinica* (Campanulaceae) vines with red, bell-shaped flowers. As was the case with most of the trip, the great majority of collections were epiphytes, in one case obtained only by the good graces of a fearless beekeeper who scrambled up at least 20 meters of sheer trunk before wiggling out to the end of a branch to snag a huge *Huperzia dacrydioides* (Lycopodiaceae).

After spending the Ethiopian New Year in the town of Jimma, the coffee capitol of Ethiopia, the expedition wound down twisty Italian occupation-era roads across the Rift Valley to the town of Goba outside of Bale National Park. Crossing the Seniti plateau at 4,000 meters plus was literally breath-taking, with gigantic

---

Smithsonian Botanical Symposium

21-22 April 2006
National Museum of Natural History

"Island Archipelagos: Cauldrons of Evolution"

In collaboration with the United States Botanic Garden and the National Tropical Botanical Garden

Island archipelagos have long been recognized as unique biological laboratories by evolutionary biologists. The classic observations by Charles Darwin on adaptive radiation in finches were made in the Galápagos archipelago and more recently ecological and evolutionary investigations in the Hawaiian Islands, Eastern Caribbean, and Azores have increased our understanding of evolutionary processes and the generation of biological diversity. Characterized by different degrees of isolation from continental floras and faunas, by equable maritime climates, and by often reduced biodiversity and trophic structure, islands often contain unique biotas that experience different selective pressures from those that dominate mainland ecosystems.

Added to this mix of biological richness are two kinds of storms – physical storms in the form of hurricanes that regularly pass through the island chains and the "storm" of human population growth and development. The former storms, along with other types of natural disturbance such as volcanic activity, have played an important role in the evolution of the biota. The latter "storm" now threatens the continued existence and ecological integrity of both terrestrial and marine ecosystems of island archipelagos. The Symposium will explore the role that island archipelagos have played in our understanding of ecological and evolutionary processes as well as the future conservation of these unique ecosystems.

The speakers at the Symposium will be Bruce G. Baldwin (University of California at Berkeley); Javier Francisco-Ortega (Florida International University); Ole Hamann (Botanic Garden, University of Copenhagen); Mike Maunder (Fairchild Tropical Botanic Garden); Robert Ricklefs (University of Missouri-St. Louis); and Warren Wagner (National Museum of Natural History).

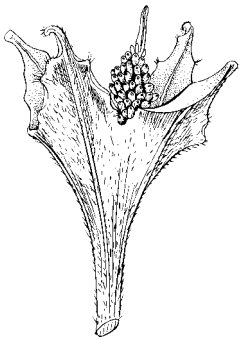
Information and registration at: http://persoon.si.edu/sbs/
Fax: 202-786-2563 – e-mail: sbs@si.edu

"*Artocarpus altilis*" from the Society Islands by John Frederick Miller, from Captain James Cook's first Pacific voyage (1768-1771)

lobelias and Ethiopian wolves (Simien foxes) fading in and out of dense mist. Collections were made on both sides of the plateau in the Ericaceae forests and pine forests lower down.

Heading back to Addis Ababa via the Rift Valley road, the final total was 173 fern collections in sets of 4 - 10, representing an estimated 160 species. While the specimens need to be more closely examined, at least one range extension was made (the treefern, *Cyathea mannii*) and some state records need to be confirmed. Due to the political climate, the dryland ferns to the east in the Afar Depression and in the Awash Valley could not be collected; hopefully, a future expedition could fill in the gaps.

The collections will be named by Faden when they reach the Smithsonian.



Ethiopian beekeeper with *Huperzia dacrydioides*. (photo by Gregory McKee)

Significant Botany Collections of 2005

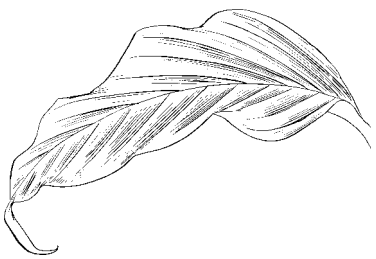
The U.S. National Herbarium acquired more than 13,500 botanical specimens during 2005. Some of the more significant acquisitions are worth noting.

An unfortunate result of administrative shuffling at the University of Nebraska was the immediate availability of large parts of the well established herbarium there – unfortunate because well distributed collections better serve the botanical community and provide more learning opportunities for students. Because tropical collections are an especially important research focus in the USNH, **Vicki Funk** made special arrangements to acquire 9,413 plant specimens (lichens, bryophytes, ferns and flowering plants) that had been collected in the South Pacific, Southeast Asia, Philippines and China. These collections significantly improve already strong collections from the Philippines and the South Pacific, whiles others provide important resources for new research initiatives in Southeast Asia and China.

In November, 2001, a momentous work on lichens, *The Lichens of North America*, was published by Irwin Brodo, and Steve and Sylvia Sharnoff. In support of their work, 1,600 lichen samples were collected across the continent over many years. Last year, this entire collection was donated by the National Museum of Natural Sciences in Ottawa, Canada to the USNH. These collections form the foundation of their research on every lichen species reported in their publication. As such, these specimens are critical links that allow one to revisit the time, and place, and possible mindset of the authors years from now. Providing historic reference services to researchers is an important function of the USNH.

An extremely important strategy in the Department's current collecting plan is to focus on acquiring plant collections through field collecting that significantly impact both the collections and our high quality research projects. One very important program is the Catalogue of New World Grasses, a multi-year effort by **Paul Peterson** and collaborators to provide a comprehensive list of grass species from the Western Hemisphere. Last year, Peterson traveled to Peru to focus of the grass flora of that highly diverse country, collecting 475 specimens that will provide important data to the Catalogue and contribute to one of the largest and most complete grass collections in the world.

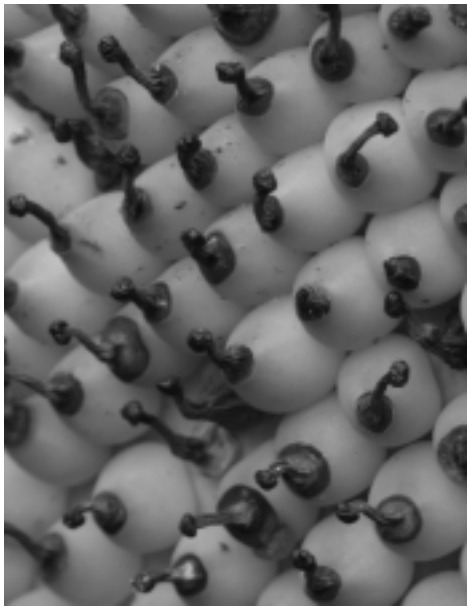
Since 1988, **Deborah Bell** has been collaborating with the National Cancer Institute (NIH) on a multi-year program to collect and test plant species for cancer-active and AIDS-active compounds in a search for effective treatments using natural products. Thousands of plant species have been collected by NCI contractors and, for each bulk sample, a voucher specimen has been produced to provide physical, unambiguous evidence of the plant species being collected. A single, complete reference collection of all these voucher specimens is currently housed in the USNH. Last year an additional 139 collections were made and provided by Doel Soejarto, a pharmacognosist from the University of Illinois-Chicago collaborating with the Field Museum. These specimens have been integrated into the existing NCI collection of over 25,000 that is managed at MSC by **Linda Hollenberg**.



The Return of the Titan

A big, rare, stinky event has happened again! The gigantic plant, *Amorphophallus titanum* (commonly known as "titan arum"), part of the living research collection of the Department, was put on display in full flower at the U.S. Botanic Garden (USBG) Conservatory, the Department's "Botanical Partner on the Mall." On the morning of 8 November, the plant was brought from the Smithsonian Botany Research Greenhouses in Suitland, Maryland, to the USBG Conservatory, where it was provided with the optimal environment for growth (very warm, bright, and humid). The titan arum began its opening the evening of 19 November and slowly began to close 21 November. The spadix collapsed on 26 November. Raised from seed by **Michael Bordelon**, Manager of Living Collections in the Department, this was the first time that this particular plant had bloomed. Pollen collected from the 2003 flowering specimen (USBG) was used to pollinate the plant. Pollination was successful and seeds are now developing. Pollen was also collected and preserved by **Dan Nicolson**.

"This plant is a true wonder of nature," said **W. John Kress**, who was interviewed by several media outlets. "The flower is a feast for the plant lover's eye and will delight the olfactory senses when in full bloom." Kress continued, "The plant is extremely rare and has only been seen by a few botanists in its native Sumatra. However, the titan arum is a spectacular example of the evolutionary diversity of complex organisms in the tropics. Investigations of such species can help us understand the processes that have shaped biodiversity on the Earth. And like many species on the planet, we must preserve the titan arum's rain forest habitats if it is to survive."



***Amorphophallus titanum* fruit (photo by G. Sword, US Botanic Garden)**

The glorious *Amorphophallus titanum* at maximum opening on 20 November 2005 (left) and with fruit on 17 January 2006 (right) at the U.S. Botanic Garden. (photo by G. Sword, US Botanic Garden)

The renown of the titan arum comes from its great size – it is reputed to have the largest known un-branched inflorescence. The plant is native only to the tropical rainforests of Sumatra, Indonesia. Since the first recorded bloom in the U.S. in 1937, titan arums have been exhibited in this country on just a few occasions. Many will recall that a titan arum owned by the USBG bloomed, for its second time, while on display at the Conservatory in July 2003, generating an enormous response of about 10,000 visitors on the peak day. As small seedlings, the USBG plant and the Smithsonian titan arum were given to the two institutions in October 1993 by Maryland arum enthusiasts Craig and Fanny Phillips. The Phillipses had grown the plants from seed collected in 1991 by California physician James R. Symon, now deceased, who had searched for the titan arum during several journeys to Sumatra. (Symon later traveled in Sumatra with Sir David Attenborough in 1993, to find the plant for the filming of the BBC production *The Private Life of Plants*.)

The titan arum emerges from, and stores energy in, a huge underground stem called a "corm." The plant blooms on an unpredictable schedule, when sufficient energy is accumulated, usually after several years. The developing inflorescence initially appears as a pale green, bud-shaped structure composed of a spathe enclosing a central spike-like spadix. At first hidden inside the spathe, the spadix is revealed as the entire structure swells. At full bloom, the spathe is fully unfurled to reveal a crimson interior. The ultimate height of the spadix depends on the energy accumulated in the corm, and the speed of the development depends on day and night temperatures. The average recorded height of an inflorescence is about 5 feet, and the largest one in cultivation was 9 feet, 7 inches. In their natural habitat, titan arums can grow up to 12-feet tall. The maximum height of the Smithsonian's titan arum was 52.5 inches (4 feet, 4.5 inches); its corm weighs over 100 pounds. At full bloom the inflorescence is well-known for smelling like rotting meat, hence it has another common name, "corpse flower." The odor is released in pulses and attracts carrion beetles and other pollinators in the plant's native Sumatra.

Curating the collections of José Cuatrecasas Arumí (1903-1996)

By Vicki A. Funk

A new project spearheaded by **Vicki Funk** has begun to make available in herbaria and through hard copy publication (and eventually documents on the web), the specimens, photographs and notebooks of José Cuatrecasas A. The goal of this specific sub-project is to curate 75 percent of the remaining specimens of the Cuatrecasas collections and to complete work on organizing the photographic slides. Cuatrecasas, a prolific collector and world renowned scientist, died in 1996 and although some progress has been made, three-fourths of his material remains to be processed. Many of the collections and slides of Cuatrecasas are central to ongoing research projects in Colombia and are greatly needed by researchers. Because of funding constraints this project must be done in stages.

The career of Cuatrecasas extends from his birth, 19 March 1903, in Campodrón (Gerona), Spain, through his studies in Barcelona and Madrid (1924-1931), graduate work in Berlin (1930-31) where he knew Adolph Engler, time at the Jardin Botánico de Madrid (1933- 39), the years in Colombia (1939-47) and in Chicago (1947-1955) to his years in Washington at the Smithsonian Institution (1955-1996). In 1939 he was on a trip to South America and if he had not been warned about the Spanish Civil War, before returning to Spain, his botanical career might have ended almost 60 years earlier. Cuatrecasas never returned to Spain until after the death of dictator Francisco Franco. Since the death of Cuatrecasas, the Herbario Nacional Colombiano (COL) in Bogotá, located at the Universidad Nacional de Colombia, has been named in his honor, and the library from his home has been reconstructed and is on display at the Institut Botánic de Barcelona (BC) in Spain.

Cuatrecasas' first publication was in 1924 and his last one is still in press. Over the years he published 265 papers most of them single authored. For 73 years he published something nearly every year, missing only 1939, 1974, and 1983; an incredible accomplishment. He was an author or coauthor of two subtribes and many genera of the Compositae. A quick check of Index Kewensis gives a list of 2,391 records with Cuatrecasas in the author field of which an astounding 1,307 are Compositae records. Few taxonomists can work in the family Compositae without making use of his work. At the time of the 1985 festschrift in his honor, Cuatrecasas was listed with B.L. Robinson, S.F. Blake, A.L. Cabrera, and H. Merxmüller, as individuals who had made truly constructive and insightful contributions to the study of the Compositae in the first three quarters of this century.

Cuatrecasas collected extensively and in areas that were difficult to reach. Over the years many new taxa have been described based on his collections and many have been named after him, including eight genera in five families (*Cuatresia* A.T. Hunziker, Solanaceae; *Cuatrecasea* Dugand, Palmae; *Cuatrecasasiella* H. Robinson, *Cuatrecasanthus* H. Robinson, *Joseanthus* H. Robinson, and *Neocuatrecasia* R.M King & H. Robinson, all in the Asteraceae; *Cuatrecasasiodendron* Standley & Steyermark, Rubiaceae; and *Quadricasaea* Woodson, Apocynaceae). A list of species honoring Cuatrecasas shows species in mosses, liverworts, ferns, and in 37 plant families. Tributes of this type will inevitably continue as the many collections by Cuatrecasas continue to be processed by the US National Herbarium and sent for study to specialists around the world. In addition, Cuatrecasas was an excellent photographer and his research files contain numerous photographs, (many on large format negatives that were printed on glass plates) dating from his field work in Colombia in the 1930s and 40s. Many of the Cuatrecasas photographs are priceless because they are from high elevation areas that have since been destroyed.

In August we were successful in obtaining funds for the first part of the project. The Collections Improvement committee headed by Carol Butler provided a grant to hire a researcher for four months to work on the photographs and Compositae specimens. The Department of Botany also provided supplemental funding from the Cuatrecasas Fund. Finding the right person to do the job might have been difficult but the Director of the National Museum of Natural History, **Cristián Samper**, came to the rescue and identified Mauricio Diazgranados C., Director Herbario, Investigador UNESIS, Departamento de Biología, Facultad de Ciencias, Pontificia Universidad Javeriana, Bogotá D.C., Colombia. Diazgranados turned out to be perfect: he is fluent in both Spanish and English, he knows Colombia and he is an expert in the Compositae. He arrived in October and has worked hard to complete much of the goals of the sub-project. **Linda Hollenberg**, **Carol Kelloff**, **Marjorie Knowles**, and **Harold Robinson** have

José Cuatrecasas (in Spain in 1923 , left, and at the Smithsonian in the 1970s).

Continued on page 10

Cuatrecasas

Continued from page 9

also helped with the project

As one might expect the work was more difficult and more interesting than we had anticipated. During the first phase of the project, Diazgranados worked on organizing the photographic archives. Photography was a passion of Cuatrecasas and during his life he took over 20,000 pictures, about 12,000 of which are here at the museum (the others are missing). These photographs, many taken in remote areas, have enormous potential for science and social commentary. In addition to taking photographs Cuatrecasas kept detailed notes as to where they were taken and who or what was in them. The photographic material housed at the museum has been placed in archival sleeves and notebooks. The journals have been copied onto archival paper and an overview of what is housed here at the museum has been prepared. Other funds were used to scan about 400 slides and we are exploring various ways to use them. Plans are also underway for other research projects. Additional slides and photographs have been found and are being incorporated into the folders. This phase is more or less finished. Several thousands of the large format negatives will eventually be scanned for digital accessibility.

During Phase 2, Diazgranados has been working on the specimens. During his life Cuatrecasas collected over 40,000 plants and he received thousands more as gifts for determination. Diazgranados is trying to reduce the backlog of unprocessed material by identifying material and checking it against our current holdings. So far he has curated all unfiled specimens of the Espeletiinae (the group of particular interest to Cuatrecasas). In addition he has rounded up and processed nearly 1,200 unmounted specimens that were Compositae but not Espeletiinae. During this processing of material he found many mistakes as well as plants without labels or otherwise disorganized and he was able to straighten out most of these. The duplicates were segregated into groups to be sent to Museo Argentino de Ciencias Naturales Bernardino Rivadavia (Buenos Aires), Real Jardín Botánico (Madrid), Field Museum of Natural History (Chicago), New York Botanical Garden, Universidad de Los Andes (Merida, Venezuela), Universidad Nacional de Colombia (Bogota), and other herbaria, according a previous established flowchart. This activity is not finished yet but will be completed soon.

Diazgranados has only a few days of work left but he departs with the goals of his sub-project completed. And there is more good news, Diazgranados is applying to graduate schools in the USA and he hopes to study the one genus, *Espeletiopsis* (Espeletiinae), that Cuatrecasas did not cover in his monograph. All in all it has been a pleasure working with Diazgranados and we hope he will be able to come back soon and continue to work on this most interesting group of plants.

Mauricio Diazgranados C. in the US National Herbarium (photo by Marjorie Knowles)

Visitors

Continued from page 2

Guido Mathieu, Ghent University, Belguim; *Peperomia* (11/3-11/17).

Tara Massad, World Wildlife Fund; restrictive range plant families (11/8-12/20).

Teresa Woods, Kansas State University; *Lespedeza* (Fabaceae) (11/15; 11/18).

Yolanda Herrera-Arrieta, Instituto Politécnico Nacional, Durango, Mexico; *Muhlenbergia* (Poaceae) (11/20-12/18).

Melissa Luckow, Cornell University; Leguminosae (11/21-11/26).

Gale Robertson, Independent researcher; volunteer interview (11/21).

Jamie Whitacre, Independent researcher; contractor interview (11/30).

Curry Keide, Maryland Department of Natural Resources; seagrasses (12/1).

Cindy Skema, Cornell University; *Dombeya* (Sterculiaceae) (12/12-12/16).

Steve Popovich, United States Department of Agriculture - Arapaho and Roosevelt National Forests, Fort Collins, Colorado; grass identification (12/13).

Michael Nee, New York Botanical Garden; Solanaceae (12/20-12/22).

Andrew Henderson, New York Botanical Garden; Arecaceae (12/27).

Botany's Type Collection

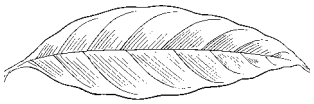
By Rusty Russell

In the world of plant taxonomy, type specimens are fundamental to understanding the link between a plant species and its published name. They are the physical manifestations of authors' species concepts and they allow us to revisit the work of earlier scientists as new information or newer technologies become available. The Department has assembled one of the finest collections of type specimens in the world and it has been the subject of many innovative developments over the years.

In 1966, under the stewardship of **Mason Hale** (deceased) and **Stanwyn Shetler** (emeritus), a groundbreaking effort was begun to digitally collect all the taxon and collection information from the tens of thousands of type specimens. This careful and methodical enterprise included an effort to confirm the type status of each specimen by checking the published original description of each species name. The result, in 1983, was a fully verified, completely databased collection of 82,500 plant type specimens that became a standard for systematics collections around the world. Each year between 500 and 1000 new type specimens are added to the Type Collection. A couple of years later, **Rusty Russell**, initiated the first use of bar codes in any systematics collection. Tracking, reconciliation and accountability was improved as a result and, again, the museum was leading the way among biology collections.

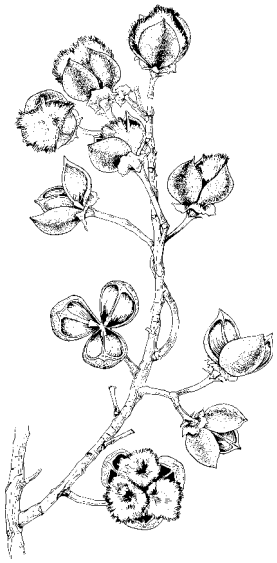
In 2000, Russell outfitted a digital imaging studio in the Department and began to create high resolution digital images of each type specimen. The goal, since realized, was to make these images available on the Internet so that scientists, researchers and students around the globe would have immediate access to these critical resources. Through the support of the a National Science Foundation grant awarded to **W. John Kress** and colleagues at Columbia University and the University of Maryland to develop an electronic field guide to plants based on the type images, the task was completed in the spring of 2005. About 80,000 scaled-down type images of vascular plants are now available on the Department's Web site <http://www.nmnh.si.edu/botany>. Additions occur every week as new type specimens are included and older types are returned from loan. One unexpected outcome of this project is that the lending of our type specimens has been reduced by about 80% as more scientists find the answers to their questions online. With reduced handling, the Department is better able to preserve each specimen while continuing to provide a high level of access. The Department can also fulfill requests for the full size digital image, which is now a 62mb TIF file. These large image files become even more critical in the event of any unfortunate specimen loss or damage.

As soon as the imaging project was complete, Russell began to assemble country subsets of the high resolution images so that he could send them directly to the countries in which they were collected. The first sets of type images are being sent to Mexico, Colombia and the Philippines and image sets will be distributed on DVDs to the world's herbaria and biodiversity centers.



A Visit from a Schomburgk

The Schomburgk brothers, M. Richard and Robert H., organized large expeditions into the hinderlands of Guyana from 1835-1843. Their botanical collections are one of the most important contributions to the exploration of the Neotropics. After Guyana, Richard Schomburgk moved to Australia and became the Director of the Adelaide Botanic Gardens (1865-1891). This October, while in Guyana, **Carol Kelloff** met a group of Australian's retracing the footsteps of the Schomburgk brothers in the southern Rupununi area. One member of the expedition was Ian Schomburgk (age 72), the great-grandson of M. Richard Schomburgk. Since he was passing through Washington, D.C., on his return trip, Kelloff invited Ian Schomburgk to visit the Department. Schomburgk met and spoke with **Vicki Funk**, **Laurence Dorr**, **Dan Nicolson**, **Pedro Acevedo**, **Mark Strong**, and **John Clark**.



Richard M. Schomburgk (left) and his great-grandson Ian Schomburgk. (photo by Marjorie Knowles)

A Quiet Man

By Heijia L. Wheeler

Daniel Grant is a quiet man. Your first impression is that he is shy, intelligent, thoughtful, and very serious. As you get to know him, it becomes clear that he is a multi-faceted, multi-talented man with many interests, energy and a great sense of humor.

Most of us can only dream of visiting far off lands and cities, but Grant has lived all over the world. He worked for the Department of State in the Foreign Service for 30 years and was posted to Pakistan, Indonesia, Viet Nam, Korea, Haiti and Paris. The average posting lasted about three years. In his various foreign assignments, Grant wrote reports on local economic conditions, promoted U.S. positions on economic issues in discussions with local government officials, and assisted U.S. business representatives in operating in the host country. His exposure to foreign cultures also gave him a chance to study a number of languages; he speaks French and German and has a nodding acquaintance with Indonesian, Vietnamese, Korean, and Urdu. Foreign Service positions are very competitive and only a small number of candidates are chosen. There are many hurdles beginning with a difficult written exam, oral exam, interviews, medical exams, and security checks. Only one or two percent of the initial applicants are selected.

When Grant retired from the State Department in 1997, he already had a keen interest in computers and at the time, the coming of the new millennium was creating a huge crisis: the Y2K problem. Most of the major computer systems were written many years ago in Cobol, a language that is considered a bit archaic. Most of the analysts who wrote the programs were retired and the demand for those who knew that language was huge. Grant saw the opportunity, took courses in Cobol and was hired by NASDAQ as a computer administrator at their Rockville facility. Two years later, Grant truly retired, but still wanted to stay involved.

He began volunteering for the Smithsonian Institution in 2002. He began at the Smithsonian Botany Research Greenhouse in Suitland, where he enters into the KE EMu database (collections management software) the necessary information for each of the specimens that are brought back from collection trips by the curators and research scientists. He does similar data entry on pressed specimens at the museum. Every plant grown in the Research Greenhouse is given a unique number; information such as the scientific name, name of donors, and other information are entered into the database.

Daniel Grant. (photo by Leslie Brothers)

At the museum, he converts the vast photographic slide collection made by **W. John Kress** to digital images and enters them into a separate data base. The Kress collection of eight families of the Zingiberales consist of about 8,000 records in Microsoft Access, 5,000 in KE EMu and 2,000 accessions growing in the greenhouse. When rhizomes of the Zingiberales are collected from all over the world, they are planted and grown, sometimes for several years. When they bloom, they are vouchered. Grant enters pertinent data on each new specimen, and upon request, photographs the plant including inflorescences. He works closely with **Ida Lopez** and it is clear that she admires and depends on him for this work. Grant is able to manipulate the KE EMu data, extract the necessary information and put it in a usable form for analysis. Lopez describes Grant as a perfectionist who likes to solve problems in creative ways. She admires his ability to analyze a task when given a set of parameters and come up with a process to get the job done.

If all that sounds a bit too serious, Grant has other interests and talents. After retirement, he decided to learn to play the piano. He had never studied music nor had he played before. He says that he started with simple melodies and now has moved on to Beethoven, Bach, and Handel. He also is an accomplished photographer with an artistic eye. He likes to bike to keep fit and finally he is an accomplished chef. His repertoire is rather eclectic but he especially likes to cook French and Italian food. With any luck, we may get to taste some of his creations.

Wurdack

Continued from page 1

Euphorbiaceae s.l. segregates. His recent 2005 paper on the phylogeny of Euphorbiaceae s.s. included classification changes with the recognition of two new subfamilies. His work now proceeds towards a full generic reclassification of that group as he recently did for Phyllanthaceae in collaboration with Petra Hoffmann (RBG Kew) and Hashendra Kathriarachchi (University of Colombo, Sri Lanka).

Wurdack's Malpighiales ordinal work also confirmed the recent claim by

Barkman et al. in 2004 that Rafflesiaceae s.s. is a member of Malpighiales. Rafflesiaceae are best known to contain a species with the world's largest flower (*Rafflesia arnoldii*) but their reduced parasitic lifestyle has long made classification difficult and most affinities have been suggested to be with other parasitic plants. Davis and Wurdack not only confirmed that Rafflesiaceae belong to Malpighiales, but also discovered a case of horizontal gene transfer (HGT). This finding was reported in 2004 in *Science* and was the first documentation of host-parasite gene transfer, in this case involving the transfer of a mitochondrial gene to Rafflesiaceae from their Vitaceae (*Tetrastigma*) hosts. They have uncovered several other remarkable examples of HGT including a gene transfer between a fern and an angiosperm. Wurdack says these examples extend the recent paradigm shift in regard to acceptance of the biological reality of HGT in plants and it is now convincingly established that HGT does indeed occur (i.e., it is not a laboratory or analytical artifact), involves a variety of genes, and can transfer genes between widely separated lineages.

Mitochondrial genes are rarely used for plant phylogenetics, as they evolve slowly – often too slowly to yield good phylogenies. Some of the most exciting and high-profile current research in plant molecular evolution, however, involves the mitochondrial genome. Mitochondrial work was the focus of Wurdack's post-doctoral research. He examined HGT in an intron in mitochondrial *cox1* and was able to demonstrate the utility of genomic information (i.e., structural changes in the mitochondrial genome) to probe deep-level questions that could not be addressed with standard molecular phylogenies.

Another area of molecular evolution that Wurdack has investigated is the origin of the toxin ricin. Ricin, a protein in the seeds of the castor bean (*Ricinus communis*), is one of the most toxic naturally occurring substances, but little has been previously understood about how the toxin evolved. Wurdack uncovered new relatives of *Ricinus* and has examined the evolution of ricin-like genes (homologs) in them.

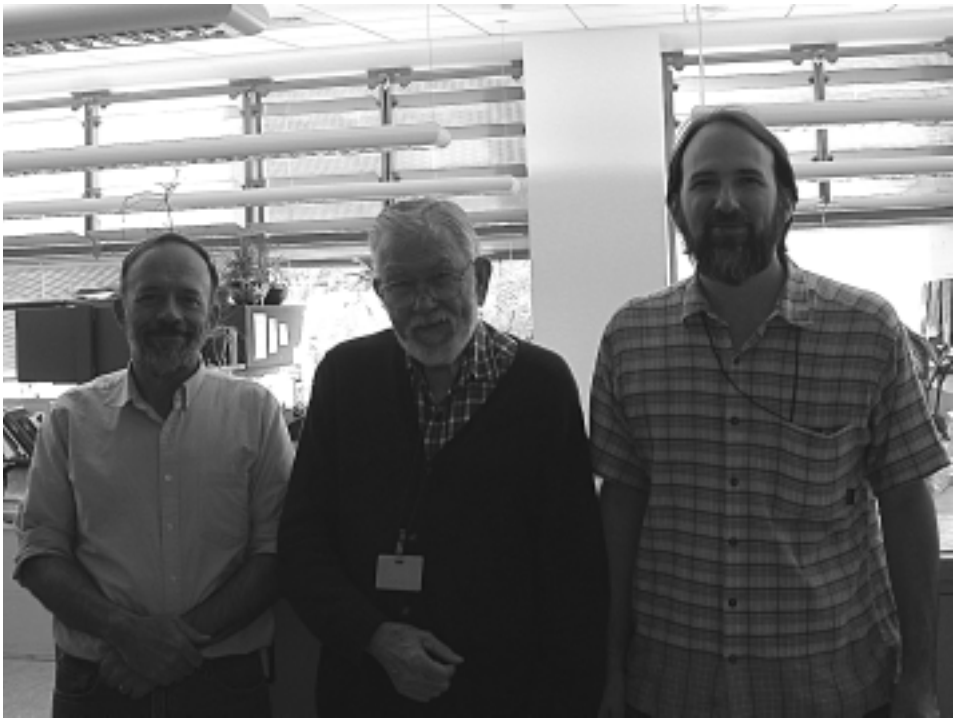
Wurdack's research also involves DNA barcoding in plants. DNA barcodes are short stretches of DNA that can be used to identify species. In plants a standardized method has remained elusive but last year in a paper in the *Proceedings of the National Academy of Sciences*, Wurdack and his collaborators, including W. John Kress and Elizabeth A. Zimmer, proposed a solution to DNA barcoding in plants.

Wurdack enjoys working with herbarium collections, especially making determinations on unidentified euphorbs that have yet to be assigned a genus. As he notes, the greatest challenges and the most interesting novelties can lay waiting among such collections as gems to be uncovered. A backlog of undescribed or problematic euphorbs already fills a case in Wurdack's office. Wurdack's work with collections has not unexpectedly brought to light a number of new species. Some he had brought to the attention of others actively working on groups (e.g., *Tragia guayanensis* L. J. Gillespie, *Dendrothrix wurdackii* Esser) and others he is describing, including new species in *Pausandra*, *Dalechampia*, *Tetraplandra*, *Tetrorchidium*, and *Aparisthmium*. Where possible (i.e., collections with usable DNA), molecular phylogenetic studies have been done in conjunction with taxonomic descriptions. The *Aparisthmium* was first assigned to that genus based on his DNA work.

Wurdack also has an interest in biogeography and his research has uncovered many unexpected patterns in *Alchornea*, *Stillingia* and *Croton*. *Croton*, further developed in collaboration with Paul Berry (University of Michigan) and his students, appears to have a single Old World introduction from the New World, whereas Wurdack found the reverse in *Alchornea*.

Another research interest of Wurdack's is the *Daphne* family, Thymelaeaceae, which were at one time associated with Euphorbiaceae based on putatively shared unusual pollen (crotonoid pollen) and chemistry (phorbol esters). It is now known that these two families are unrelated (Thymelaeaceae is in Malvales). He unexpectedly found that the Guyana Highland endemic family Tepuianthacaeae was related to Thymelaeaceae and in collaboration with James Horn (Duke University) is reclassifying it as a subfamily of Thymelaeaceae. Wurdack continues to work, most recently in collaboration with Zachary Rogers (Missouri Botanical Garden) on developing a complete generic-level phylogeny of Thymelaeaceae. They have already

Continued on page 14



Three generations of euphorbiologists: Kenneth J. Wurdack (right) with Grady Webster (center) and Gordon McPherson. Taken 6 October 2005 at the Monsanto Center, Missouri Botanical Garden three weeks before Webster passed away. (photo by Zach Rogers)

Wurdack

Continued from page 13

discovered that the neotropical genera have an especially complex biogeography.

In addition to lab work, Wurdack has experience in the field, including many trips in Venezuela and the southern United States. His fieldwork encompasses over 3,000 personal collection numbers and ranges from general collecting to specialty collecting of Malpighiales. In the field he has found many new plant distribution records, studied floral biology and pollination, and helped set up permanent plots for plant ecology studies. Wurdack has an interest in floristics and the euphorbs are a large component of many tropical floras. He is especially interested in producing Euphorbiaceae treatments for the floras of Ecuador and the Guianas with contributions from himself and other experts.

Finally, Wurdack has had a long interest in botanical history, especially of the southern United States. His interests in historical botany were inspired by and relate to the collections at the U.S. National Herbarium. They were also influenced by noted botanical historian Joseph Ewan who spent a period of residence in the Department in the 1980s as a visiting scholar. Wurdack's historical topics include the history and types of the Biltmore Herbarium (25,000 sheets given to US), and biographical sketches on Joseph Herman Simpson (Florida collector), Hardy Bryan Croom (1797-1837, botanist in Florida and North Carolina), and Alvan Wentworth Chapman (1809-1899, Florida botanist). Wurdack's historical expertise on these subjects has been sought by a number of individuals and acknowledged in over 10 publications including two books (E.O. Rothra, *Florida's Pioneer Naturalist: The Life of Charles Torrey Simpson*, 1995; G. Fishman, *Journeys Through Paradise: Pioneering Naturalists in the Southeast*, 2000). The importance of supplementary historical detective work on the US collections can be seen with the Biltmore specimens that often have poor documentation coupled with the idiosyncratic practices of Biltmore Herbarium staff. He most recently chronicled the history of the rare southeastern United States euphorb *Croton alabamensis*.

Wurdack has set high research goals for his continuing work on the Euphorbiaceae, DNA barcoding, and historical botany of the southeast United States.

Publications

Acevedo-Rodriguez, P. 2005. Sapindaceae. Pp. 46-66; 75-98. *In*: Steyermark, J.A., E. Berry, K. Yatskievych and B.K. Holst (eds.). *Flora of the Venezuelan Guayana. Vol 9. Rutaceae-Zygophyllaceae.* Missouri Botanic Garden Press, St. Louis.

Acevedo-Rodriguez, P. and **M.T. Strong**. 2005. Monocots and gymnosperms of Puerto Rico and the Virgin Islands. *Contrib. U.S. Nat. Herb.* 52: 1-416.

Adey, W. 2006. Lessons learned from the construction and operation of microcosms and mesocosms. P. 30. *In*: Precht, W. (ed.). *Restoration of Coral Reef Ecosystems*. CRC Press, Boca Raton.

Athanasiadis, A. and **W. Adey**. 2006. The genus *Leptophytum* Adey (Melobesioideae, Corallinales) on the northern Pacific Coast of North America. *Bot. Mar.* 49(1): 134.

Beltrán, H. and **H. Robinson**. 2005. A new species of *Aequatorium* (Asteraceae: Senecioneae) from Peru. *Composit. Newsl.* 42: 5-7.

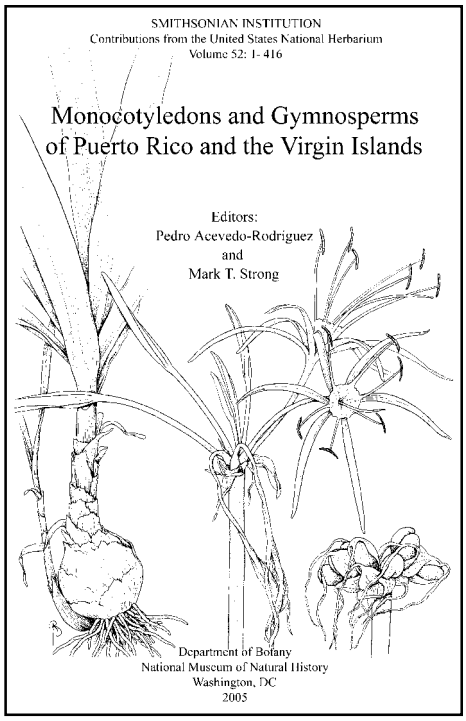
Berry, P.E., A.L. Hipp, **K.J. Wurdack**, B. Van Ee and R. Riina. 2005. Molecular phylogenetics of the giant genus *Croton* and tribe Crotoneae (Euphorbiaceae sensu stricto) using ITS and *trnL-trnF* DNA sequence data. *Am. J. Bot.* 92(9): 1520-1534.

Bordelon, M. and **W.J. Kress**. 2005. Tropical ginger cultivation in North American temperate climates. *Sibbaldia* 3: 83-91.

Clarke, H.D. and **V.A. Funk**. 2005. Using checklists and collections data to investigate plant diversity. II. An analysis of five florulas from northeastern South America. *Proc. Acad. Nat. Sci. Phila.* 154: 29-37.

Davis, C.C., W.R. Anderson and **K.J. Wurdack**. 2005. Gene transfer from a parasitic flowering plant to a fern. *P. Roy. Soc. B.* 272(1578): 2237-2242.

Davis, C.C., C.O. Webb, **K.J. Wurdack**,



C.A. Jaramillo and M.J. Donoghue. 2005. Explosive radiation of Malpighiales supports a mid-Cretaceous origin of modern tropical rain forests. *Am. Nat.* 165(3): E36-E65.

Dorr, L.J. and P.E. Berry. 2005. Tiliaceae and newly segregated Muntingiaceae. Pp. 342-343. *In*: Berry, P.E., et al. (eds.). *Flora of the Venezuelan Guayana 9*. Missouri Botanical Garden Press, St. Louis.

Dorr, L.J. and W. Meijer. 2005. Tiliaceae. Pp. 343-362. *In*: Berry, P.E., et al. (eds.). *Flora of the Venezuelan Guayana 9.* Missouri Botanical Garden Press, St. Louis.

Faust, M.A., R.W. Litaker, M.W. Vandersea, S.R. Kibler and P.A. Tester. 2005. Dinoflagellate diversity and abundance in two Belizean coral reef-mangrove lagoons: a test of Margalef's Mandala. *Atoll Res. Bull.* 534: 1-28.

Finot, V.L, **P.M. Peterson**, F.O. Zuloaga, **R.J. Soreng** and O. Matthei. 2005. A revision of *Trisetum* (Poaceae: Pooideae: Aveninae) in South America. *Ann. Mo. Bot. Gard.* 92(4): 533-568.

Fu, Y.B., B.E. Coulman, Y.S.N. Ferdinandez, J.Cayouette and **P.M. Peterson**. 2005. Genetic diversity of fringed brome (*Bromus ciliatus*) as determined by amplified fragment length polymorphism. *Can. J. Bot.* 83(10): 1322-1328.

Funk, V.A. and **C.L. Kelloff**. 2005. Preface. P. ix. *In*: T. Hollowell and R. Reynolds (eds.) Checklist of the Terrestrial Vertebrates of the Guiana Shield. *Bull. Biol. Soc. Wash.* no. 13.

Funk, V.A., R.J. Bayer, S. Keeley, R. Chan, L. Watson, B. Gemeinholzer, E. Schilling, J. L. Panero, B.G. Baldwin, N. Garcia-Jacas, A. Susanna and R.K. Jansen. 2005. Everywhere but Antarctica: Using a supertree to understand the diversity and distribution of the Compositae. *Biol. Skr.* 55: 343-373.

Funk, V.A., P.C. Hoch, A. Prather and **W.L. Wagner**. 2005. The importance of vouchers in science. *Taxon* 54: 127-129.

Givnish, T.J., J.C. Pires, S.W. Graham, M.A. McPherson, L.M. Prince, T.B. Patterson, H.S. Rai, E.H. Roalson, T.M. Evans, W.J. Hahn, K.C. Millam, A.W. Meerow, M. Molvray, P.J. Kores, H.E. O'Brien, J.C. Hall, **W.J. Kress** and K.J. Sytsma. 2005. Repeated evolution of net venation and fleshy fruits among monocots in shaded habitats confirms *a priori* predictions: evidence from an *ndhF* phylogeny. *P. Roy. Soc. B.* 272: 1481-1490.

Hollowell, T. and R.P. Reynolds, eds. 2005. Checklist of the Terrestrial Vertebrates of the Guiana Shield. *Bull. Biol. Soc. Wash.*, no. 13.

Hollowell, T. and R.P. Reynolds. 2005. Introduction. Pp. 1-6. *In*: T. Hollowell and R. Reynolds (eds.) Checklist of the Terrestrial Vertebrates of the Guiana Shield. *Bull. Biol. Soc. Wash.* no. 13.

Kathriarachchi, H., P. Hoffmann, R. Samuel, **K.J. Wurdack** and M.W. Chase. 2005. Molecular phylogenetics of Phyllanthaceae inferred from five genes (plastid *atpB, matK*, 3*'ndhF*, *rbcL*, and nuclear *PHYC*). *Mol. Phylogenet. Evol.* 36(1): 112-134.

Kibler, S.R., **M.A. Faust**, M.V. Vandersea, S.M. Varnam, R.W. Litaker and P.A. Tester. 2005. Water column structure and circulation in the Main Channel, Twin Cays. *Atoll Res. Bull.* 535: 1-24.

Kite, G.C., P. Hoffmann, D.C. Lees, **K.J. Wurdack** and L.J. Gillespie. 2005. α-Homonojirimycin and other polyhydroxyalkaloids in *Suregada* Roxb. ex Rottl. (Euphorbiaceae). *Biochem. Syst. Ecol.* 33(11): 1183-1186.

Lapointe, B.E., P.J. Barile, **M.M. Littler**, **D.S. Littler**, B.J. Bedford and C.T. Gasque. 2005. Macroalgal blooms on southeast Florida coral reefs: I. Nutrient stoichiometry of the invasive green alga *Codium isthmocladum* in the wider Caribbean indicates nutrients enrichment. *Harmful Algae* 4(6): 1092-1105.

Lapointe, B.E., P.J. Barile, **M.M. Littler** and **D.S. Littler**. 2005. Macroalgal blooms on southeast Florida coral reefs: II. Cross-shelf discrimination of nitrogen sources indicates widespread assimilation of sewage nitrogen. *Harmful Algae* 4(6): 1106-1122.

Littler, D.S. and **M.M. Littler**. 2005. Study of living algae in the tortugas produced the "Bible" for identifying those of the tropical Atlantic. P. 36. *In*: Shinn, E.A. and W.C. Jaap (eds.). *Field Guide to the Major Organisms and Processes Building Reefs and Islands of the Dry Tortugas: The Carnegie Dry Tortugas Laboratory Centennial Celebration (1905-2005)*. University of Miami Rosenstiel School, Miami.

Littler, M.M., **D.S. Littler** and **B.L. Brooks**. 2005. Extraordinary mound building *Avrainvillea* (Chlorophyta): the largest tropical marine plants. *Coral Reefs* 24(3): 359.

Lorence, D.H. and **W.L. Wagner**. 2005. A revision of *Psychotria* (Rubiaceae) in the Marquesas Islands (French Polynesia). *Allertonia* 9(1): 1-37.

Motley, T.J., **K.J. Wurdack** and P.G. Deprete. 2005. Molecular systematics of the Catesbaeeae-Chiococceae complex (Rubiaceae): flower and fruit evolution and biogeographic implications. *Am. J. Bot.* 92(2): 316-329.

Pandey, A.K., **J. Wen** and J.V.V. Dogra (eds.). 2006. *Plant Taxonomy: Advances and Relevance*. CBS Publishers & Distributors, New Delhi. 541 pp.

Robinson, H. 2005. New species and new combinations in the tribe Vernonieae (Asteraceae). *Phytologia* 87(2): 80-96.

Robinson, H. 2005. *Parapolydora* (Asteraceae), a new genus of Vernonieae from South Africa. *Phytologia* 87(2): 75-79.

Robinson, H. 2005. Validation of the Supertribe Asterodae. *Phytologia* 87(2): 73-74.

Robinson, H. and N.E. Woodley. 2005. A new species of *Harmstonia* from Bolivia (Dolichopodidae: Diptera). *P. Entomol. Soc. Wash.* 107(2): 436-440.

Saarela, J.M., **P.M. Peterson** and J. Cayouette. 2005. *Bromus hallii* (Poaceae), a new combination for California, U.S.A., and taxonomic notes on *Bromus orcuttianus* and *Bromus grandis*. *Sida* 21(4): 1997-2013.

Samper, C. 2005. Foreword. P. vii. *In*: T. Hollowell and R. Reynolds (eds.) Checklist of the Terrestrial Vertebrates of the Guiana Shield. *Bull. Biol. Soc. Wash.* no. 13.

Samuel, R., H. Kathriarachchi, P. Hoffmann, M. Barfuss, **K. Wurdack**, C.C. Davis and M.W. Chase. 2005. Molecular phylogenetics of Phyllanthaceae: evidence from plastid *matK* and nuclear *PHYC* sequences. *Am. J. Bot.* 92(1): 132-141.

Strong, M.T. 2005. Two new species of *Rhynchospora* sect. *Tenues* (Cyperaceae) from the Guianas, South America. *Novon* 15(3): 479-483.

Terrell, E.E., **H.E. Robinson**, **W.L. Wagner** and D.H. Lorence. 2005. Resurrection of genus *Kadua* for Hawaiian Hedyotidinae (Rubiaceae), with emphasis on seed and fruit characters and notes on south Pacific species. *Syst. Bot.* 30(4): 818-833.

Wagner, W.L. 2005. *Honckenya*. *Fl. N. Amer.* 5: 137-140.

Wagner, W.L. 2005. *Wilhelmsia*. *Fl. N. Amer.* 5: 136-137.

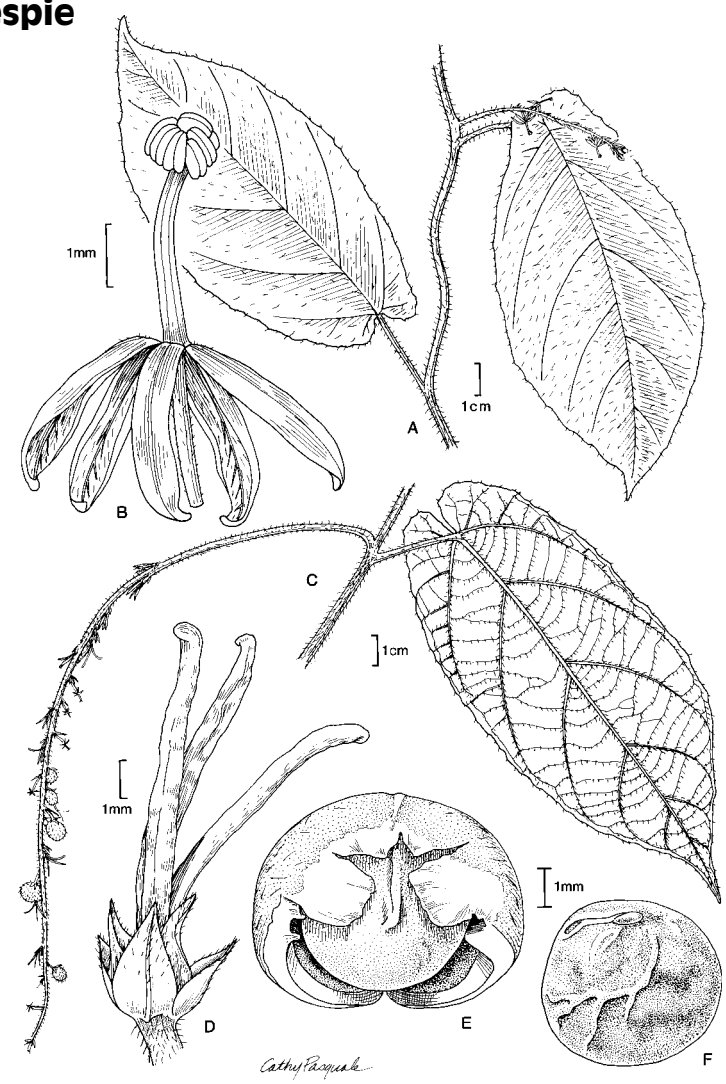
Wen, J. and A.K. Pandey. 2006. Intiating DNA molecular systematic studies in a developing country. Pp. 31-43. *In*: Pandey, A.K., J. Wen and J.V.V. Dogra (eds.). *Plant Taxonomy: Advances and Relevance*. CBS Publishers & Distributors, New Delhi.

Wurdack, K.J., P. Hoffmann and M.W. Chase. 2005. Molecular phylogenetic analysis of uniovulate Euphorbiaceae (Euphorbiaceae sensu stricto) using plastid *rbcL* and *trnL-F* DNA sequences. *Am. J. Bot.* 92(8): 1397-1420.

Art by Alice Tangerini

Tragia guayanensis L.J. Gillespie

In addition to Alice Tangerini, other illustrators, such as Cathy Pasquale, are often contracted out to do special projects for the Department. *Tragia guayanensis* was uncovered among unidentified Euphorbiaceae collections and recognized as undescribed by Kenneth J. Wurdack. Lynn Gillespie (now at the Canadian Museum of Nature, Ottawa) was studying *Tragia* and its allies while as a post-doctoral fellow at the US National Herbarium and found this plant was unusual enough to deserve placement in a new monotypic section of *Tragia* (see Gillespie, *Novon* 4: 330-338; 1994). Drawing by Cathy Pasquale.



Smithsonian
National Museum of Natural History

Department of Botany
PO Box 37012
NMNH, MRC-166
Washington DC 20013-7012