

The Plant Press



Smithsonian
National Museum of Natural History

New Series - Vol. 16 - No. 1

January-March 2013

Travel Diary

Trails and Trials in Papua New Guinea

By Jun Wen and Marc Appelhans

We recently conducted field work in Papua New Guinea (PNG) from October 30 to November 28, 2012, to primarily study Vitaceae and *Melicope* of Rutaceae. New Guinea is the second largest island in the world, situated in the southwestern Pacific Ocean just south of the equator immediately north of Australia. The island is the largest in the tropics and is close to Greenland in size. New Guinea is well-known for its rich biodiversity and its cultural diversity with nearly 1,000 languages (tongues). Papua New Guinea occupies the eastern half of New Guinea; the western portion of the island belongs to the Papua and West Papua provinces of Indonesia. Jun Wen collected in both provinces in Indonesia a few years ago.

On October 30, 2012, we flew from Singapore to the PNG capital of Port Moresby. We only spent a few hours at the Botanic Gardens in Port Moresby and then flew directly to Lae, which is the second largest city in PNG and the capital of Morobe province. Lae is located at the beginning of the PNG Highlands Highway, the mainland transport corridor from the coast to the Highlands region. It is also an important port city in PNG, and was initially developed during the gold rush of the 1920s and 30s. Gold was mined in several regions of the province.

Our field study was conducted in collaboration with colleagues at the Lae Botanic Gardens and the Papua New Guinea National Herbarium (LAE). Our host was Robert Kiapranis, the Director of the Botany Division of the Forest Research Institute (FRI). FRI is a govern-

ment agency that conducts research on the sustainable management and wise resource utilization of forest resources. FRI also provides a scientific basis for the management of PNG's forest resources through research activities.

Before going into the field we spent several days at both the LAE herbarium and the Lae Botanic Gardens natural forest area, where we collected plants. We were impressed with both the large number of herbarium specimens and the Botanic Gardens as a living gem in the city's center.

The Lae Botanic Gardens occupy 38 hectares situated between the two major subdivisions of the city of Lae – Top Town and Eriku. The garden mostly consists of natural lowland rain forest with creeks running through. It also contains greenhouses for special Orchidaceae and Araceae collections. The Botanic Gardens is administered by the PNG's FRI and has approximately 1,500-2,000 plant species. The landscape is dominated by many large buttressed trees, which are densely covered by epiphytes and climbers. The combination of a large size and rich diversity of lowland rain forest habitat in the middle of the city makes the garden perfectly suited for educational as well as research purposes. Michael Lovave, a horticultural botanist at LAE, mentioned that at least 41 species of palms are present in the garden although a complete inventory of plant species in the garden still has to be tackled.

Established in the 1940s the LAE herbarium quickly grew to be the largest plant specimen collection in PNG

with about 300,000 specimens including 2,335 type specimens. Additionally there are 100,000 spirit collections. This herbarium has been an important repository of the New Guinean flora and is an essential facility for both research and conservation. In addition to PNG plants, the LAE herbarium holds a good representative plant collection from the neighboring regions, such as the Indonesian provinces of New Guinea, the Solomon Islands, western Indonesia, Malaysia and tropical Australia. Moreover, the LAE herbarium holds collections of a number of important collectors including L. J. Brass, L. Craven, J. R. Croft, R. D. Hoogland, R. Pullen, J. C. Saunders, R. Schodde, Wayne Takeuchi, and J. S. Womersley. The LAE herbarium ranks third or fourth in size in Southeast Asia, only next to the Herbarium Bogoriense (BO) in Indonesia and the Herbarium of the Singapore Botanic Gardens (SING) in Singapore. It is about the same size as the Herbarium of Forest Research Institute Malaysia (KEP) in Kepong of Malaysia.

The herbarium collections have been well curated under the stewardship of several botanists: Robert Kiapranis, the Director of the Herbarium, Kipiro Damas, a senior botanist, Michael Lovave, a horticultural botanist, Oliver Paul, a botanist, Wayne Takeuchi, a botanist from the United States who collected extensively in PNG, and Thomas Magun, a collections specialist. In recent years the LAE Herbarium has been involved in databasing and digitizing its collections.

Continued on page 12

Pedro Acevedo traveled to Bronx, New York (10/8 – 10/9) to consult the herbarium at the New York Botanical Garden and meet with colleagues for a treatment of Sapindaceae for the Flora of Cuba Project.

Emanuela Appetiti and **Alain Touwaide** traveled to San Diego, California (11/15 – 11/18) to attend the annual meeting of the History of Science Society, where Touwaide chaired a session devoted to “Sense, Body, and Knowledge in the Early Modern World”, while Appetiti attended the meeting of the editorial board of *ISIS-Current Bibliography*; to Greece (11/22 – 12/11) to analyze ancient Greek medical and botanical manuscripts, deliver a lecture at the Archaeological Museum of Volos, present the annual Wiener Lecture at the American School for Classical Studies at Athens, and to deliver seminars at the University of Athens and at the Aristotle University of Thessaloniki; and

to Rome (12/12 – 12/18) to attend the opening ceremony of the Academic Year 2012-2013 of the Accademia di Storia dell’Arte Sanitaria (Italian Academy for the History of Medical Arts), devoted to the impact of the plants of the New World on the Old World Pharmacopoeia, and to present a plenary lecture.

Barret Brooks and **James Norris** traveled to Mayaguez, Puerto Rico (11/27 – 12/8) to retrieve a donated collection of David Ballentine.

Sarah Eichhorn traveled to Vienna, Austria (11/7 – 11/12) to attend a meeting of the staff of the International Association for Plant Taxonomy; and to Bratislava, Slovakia (11/12 – 11/14) for a meeting with the staff of IAPT to discuss business matters.

Christian Feuillet traveled to Paris, France (10/15 – 10/19 & 10/29 – 10/31) and to Leiden, the Netherlands (10/22 – 10/26) to work in both herbaria on their collections of Boraginaceae, and to represent the Department of Botany and give a talk at the Flora of the Guianas Consortium Board Meeting.

Vicki Funk traveled to Vienna, Austria (11/6 – 11/14) to present a paper at a symposium at the Institute of Botany held in honor of the retirement of Professor Tod Stuessy, and to attend a joint meeting of the staff of the International Association for Plant Taxonomy-main office and IAPT-USA; to London, Great Britain (11/14 – 11/17) to study plant specimens of Compositae at the Royal Botanic Gardens, Kew; to Chicago, Illinois (10/21 – 10/23) to participate on a dissertation committee; and to New York, New York (10/4 – 10/5) to attend a meeting with JSTOR as President of International Association for

Plant Taxonomy.

W. John Kress traveled to New Orleans, Louisiana (10/18 – 10/20) to attend the Organization for Tropical Studies Board of Director’s meeting; to Menominee, Wisconsin (11/4 – 11/6) to discuss the Indigenous GEO Initiative at the College of the Menominee Nation; and to San Jose, California (11/30 – 12/7) to lead a meeting of the Las Cruces Advisory Committee, and to conduct a site visit for the 2013 annual meeting as the Executive Director for the Association for Tropical Biology and Conservation.

Sonoe T. Nakasone traveled to Raleigh, North Carolina (10/13 – 10/20) to present a poster about the Field Book project at the Society of Vertebrate Paleontology meetings; and to Richmond, Virginia (10/24 – 10/27) to give a presentation on using field books as primary resources at the Mid-Atlantic Regional Archives Conference.

Sylvia Orli and **Ingrid Lin** traveled to New Haven, Connecticut (10/16 – 10/18) to attend an EMU Users Group conference at the Peabody Museum, Yale University.

Rusty Russell traveled to Beijing, China (10/18 – 10/28) to participate in a Biodiversity Informatics Standards (TDWG) meeting.

Alice Tangerini traveled to Chicago, Illinois (10/16 – 10/21) to attend the American Society of Botanical Artists meeting.

Jun Wen traveled throughout Papua New Guinea (10/27 – 11/29) with **Marc Appelhans** to collect Vitaceae and Rutaceae; and to St. Louis, Missouri (10/12 – 10/14) as an invited speaker at the 59th Annual Systematics Symposium at the Missouri Botanical Garden.



The Plant Press

Revised Series - Vol. 16 - No. 1

Chair of Botany

Warren L. Wagner
(wagnerw@si.edu)

EDITORIAL STAFF

Editor

Gary Krupnick
(krupnickg@si.edu)

Copy Editors

Robin Everly, Bernadette Gibbons, Rose Gullledge, and Dail Laughinghouse

News Contacts

MaryAnn Apicelli, Robert Faden, Rusty Russell, Alice Tangerini, and Elizabeth Zimmer

The Plant Press is a quarterly publication provided free of charge. To receive notification of when new pdf issues are posted to the web, please subscribe to the listserv by sending a message to listserv@si-listserv.si.edu containing only the following in the body of the text: SUBSCRIBE PLANTPRESS-NEWS Firstname Lastname. Replace “Firstname Lastname” with your name.

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

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

Visitors

Wenna Chen, South China Botanical Garden, Chinese Academy of Sciences; DNA Barcoding internship (2/9/12-2/9/13).

Panya Vij, Alexandria, Virginia; *Silene caroliniana* (Caryophyllaceae) (6/22/12-1/19/13).

Alison Shapcott, University Sunshine Coast, Australia; Southeast Queensland rain forest plant DNA barcoding (7/3-12/15).

Ellen Danford, Stanford University; Herbarium curation internship (7/9-10/5).

Qing Liu, South China Botanic Garden, Chinese Academy of Sciences; *Sorghum* (Poaceae) (7/31/12-1/31/13).

Sarah Owen, George Washington University; Maps intern (8/27-12/7).

Ryan Grant, American University; Maps Intern (9/4-12/7).

José Cuatrecasas' Magnum Opus to be Published

José Cuatrecasas (1903–1996) is widely considered to be one of the great botanical explorers of the South American páramo. Cuatrecasas was born on 19 March 1903, in Camprodón, Spain, in the foothills of the Pyrenees. He studied in Barcelona and Madrid (1924–1931) and later in Berlin (1932–1938). His first publication was in 1924, when he was 21 years old. By 1932 he was an internationally recognized botanist and was invited by the Colombian government to the bicentennial anniversary of the birth of José Celestino Mutis (1732–1808). In 1938 he returned to Colombia and while there was warned about the tragic political situation unfolding in Spain; the growing power of Franco had made it unsafe for him to return home. In the years that followed, he worked in Colombia (1939–1947), in Chicago at the Field Museum (1947–1955), and in Washington here in the Department of Botany (1955–1996).

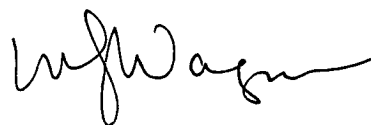
From his very first trip to South America in 1932, Cuatrecasas began working on the subtribe Espeletiinae of the Composite family. The Espeletiinae, commonly known as “frailejones,” are not just one of the most fascinating radiations of the Neotropics, but also one of the most challenging plant groups to study because of the complex variation patterns and extensive hybridization present in an evolutionary radiation of young age. More than six decades later, after describing dozens of new species and most of the genera, he was still refining the text, analyses, illustrations, and photographs for his growing and already very large monographic manuscript.

During expeditions to South America (1932–1979) José Cuatrecasas made more than 28,000 plant collections. He compiled an astounding photographic archive with more than 20,000 images, accompanied by detailed descriptions. He published more than 250 research papers, including 3,308 new taxa of plants. His field collection books, journals, and images are housed in the Botany Department and are being digitized and organized for wide access via a web site that has been developed by Mauricio Diazgranados and

Vicki Funk, which will launch in 2013.

Cuatrecasas died at age 93 on 23 May 1996, only about ten days after his last working visit to the U.S. National Herbarium. Don José worked energetically right up until the end of his life, even continuing to talk about preparations for the publication of his manuscript on the Espeletiinae while in the hospital. During the days he was in the hospital I made sure he knew that we were committed to help prepare his manuscript for publication and publish it. It has been far longer than I hoped and the manuscript has been streamlined editorially and the illustrations and photographic plates processed for publication over a number of years. Two biographies of his life were published shortly after his death (*Compositae Newsletter* 29: 1-30. 1996; *Taxon* 46: 132-134. 1997).

While it has taken far longer than I hoped to edit the text, revise illustrations, and process photographic plates, it was finally submitted for publication to the *Memoirs of the New York Botanical Garden* under a publication agreement made in 2008. The book-length monograph, *A Systematic Study of the Subtribe Espeletiinae (Heliantheae, Asteraceae)*, is nearly 700 pages with 269 illustrations and 68 photographic plates providing detailed and illustrated descriptions of all of the genera consisting of 105 species (one small group of the lineage was not finished) along with analyses of the taxonomy, morphology, evolution and biogeography. Recently I have received have word from Jim Miller, Dean and Vice President for Science, at New York Botanical Garden that Cuatrecasas' career masterpiece will be published by the end of January or early February 2013. It will be wonderful to see José's magnum opus brought to completion, made available to all, and forming the basis for continued study of this fascinating group of plants.



Chair

With

A

View

Warren
L.
Wagner



Leslie Johnson, University of Oregon; Historical expeditions project (9/5/12-1/4/13).

Brooke Scott and Neal Freyman, University of Maryland; Historical expeditions project (9/7/12-1/4/13).

Jefferson Carvalho-Sobrinho, Feira de Santana State University, Brazil; Malvaceae and *Bombax* (Bombacaceae) (10/1-10/23).

Robert Muscarella, Columbia University; DNA barcoding (10/1-10/2).

Jianqiang Zhang, Peking University,

China; *Rhodiola* (Crassulaceae) (10/8/12-10/7/13).

Calvin Stone, Integrated Federal Solutions, Virginia; Mediterranean medicinal plants (10/11).

Lei Duan, Northwest Agriculture and Forestry University, China; *Caragana* and *Cladrastis* (Fabaceae) (10/15-10/14).

Ming-Qin Zhou, Yangtze University, China; Vitaceae (10/15-10/14).

Genevieve Croft, Washington University; *Byrsonima crassifolia* (Malpighiaceae) (10/16/12-10/16/13).

Bruce Herr and Gavin La Rowe, ChalkLabs, Indiana; Mediterranean medicinal plants (10/17).

Nara Furtado de Oliveira Mota, Universidade Federal de Minas Gerais, Brazil; Brazilian *Xyris* (Xyridaceae) (10/22-10/25).

Raul Puente, Desert Botanical Garden; *Opuntia* (Cactaceae) (10/22-10/24).

Andrew Alexander-Ozinskas, Natura Apothecary, Kentucky; *Historia Plantarum* Collection (10/24).

Continued on page 5

Staff Research & Activities

The Field Book Project staff had a busy autumn presenting the results of their research at various conferences. On 12 October, **Emily Hunter** presented on the Field Book Project at Revealing Hidden Treasures, the 2012 Smithsonian Archives Fair (slides: http://www.slideshare.net/ej_hunter/the-artistry-in-field-notes). On 26 October, **Sonoe Nakasone** presented the Field Book Project at the Mid Atlantic Regional Archives Conference in Richmond, Virginia (slides: <http://www.slideshare.net/sonoenakasone/cataloging-field-books-describing-scientific-primary-resources-14870256>). And on 2 October, **Carolyn Sheffield** presented on the Field Book Project at the 936th Meeting of the Botanical Society of Washington (slides: <http://www.slideshare.net/carolynsheffield/content-and-context-15087972>).

In October, at the 2012 annual meeting of the American Society of Botanical Artists (ASBA) in Chicago, Illinois, **Alice Tangerini** taught a one day class on scientific botanical illustration. In the class, she used oak leaves and acorns collected from the Chicago Botanic Gardens and the grounds of the US Capitol. The class was structured around an emphasis on techniques of shading with line and stipple using brushes and pens with ink media. As a Board of Directors Member of the ASBA, Tangerini also presented a summation of her work on the ASBA Members Gallery which she manages. Her duties include editing, uploading and updating member bios and images. The conference, held at the Chicago Botanic Gardens, featured lectures on botanical art and illustration and technique presentations. The meeting was well attended with over 200 members participating.

New Faces

Melinda Peters has joined the staff of Core Collections Management as a Museum Technician. Peters comes to us after five years at the Combined Herbaria at Harvard University where she served as a senior Curatorial Assistant with respon-

sibilities within all areas of herbarium operations. She assumes responsibility within CCM for the acquisition, documentation, processing and reporting of all new collections, as well as management of the exchange program, and will share client service duties with other CCM staff. Peters received her B.S. in Biology from James Madison University in Harrisonburg, Virginia in 2003, where she was honored with the Margaret A. Gordon Memorial Scholarship for Excellence in Biology and the Young Botanist Award. For the period 2001-2003 she was the George Warren Chappellear Jr. Scholar, and received a Certificate of Recognition-Young Botanist Award from the Botanical Society of America in 2003. Peters obtained her Master's in Botany from North Carolina State in 2005 with a thesis entitled, "Genetic analyses of the Federally endangered *Echinacea laevigata* using amplified fragment length polymorphisms (AFLP) – inferences in population genetic structure and mating systems." She received a study grant from the Virginia Nature Conservancy, taught introductory botany and biology laboratories, and assisted extension agents across North Carolina with plant identifications. She is currently finishing a Master's in Museum Studies from Harvard University (May 2013), during which she has completed internships at the Arnold Arboretum, metaLAB at Harvard, and Smithsonian Gardens (education and outreach). Peters is well known in the



Melinda Peters



Meghann Toner

collections community as Assistant Editor for the Society of Herbarium Curators newsletter, and a member of both the Society for the Preservation of Natural History Collections and the American Association of Museums.

Meghann Toner has joined the staff of Core Collections Management as a Museum Technician. Most recently, Toner served under Melissa Islam as a herbarium specialist at the Denver Botanic Garden where her duties included managing loans and acquisitions, overseeing development of the DBG collection database, digital imaging, geo-referencing of collections, producing public outreach materials, leading herbarium tours, and recruiting, training and supervising students and volunteers. Toner received her B.S. in Biological Sciences from the University of Colorado in 2007, and her Master's in Museum Studies from the University of Leicester (UK) in 2010. The latter included research in the Natural History Museum (London), Ulster Museum, and the Oxford University Museum of Natural History, as well as conducting post-graduate research in public outreach at the Chester Zoo (Upton, UK). Her M.Sc. thesis, "Curators: The stewards of museum collection knowledge," was presented earlier this year at the Denver Botanic Garden. Previous work experiences include Research Assistant in the Museum and Academic Collections Department of the University of Colorado and Biogeographic Data Analyst for OBIS-USA (Ocean Biogeographic

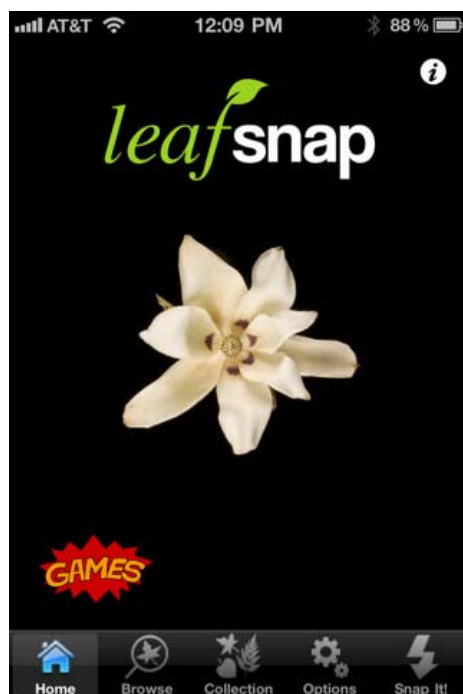
Information System). She is the recipient of a Faber Research Grant from the Society for the Preservation of Natural History Collections (SPNHC), and a Fitzgerald Travel Grant to attend the 2012 SPNHC Annual Meeting at Yale to present a paper on digitizing fungus collections.

Awards & Grants

Alain Touwaide and **Emanuela Appetiti** were appointed Honorary Member and Corresponding Member, respectively, of the Accademia di Storia dell'Arte Sanitaria (Italian Academy for the History of Medical Arts).

Leafsnap Continues to Attract Users

In its online news of 25 December 2012, Scientific American editors named Leafsnap as one of the top 10 science apps for smart phones or tablets (<http://www.scientificamerican.com/section.cfm?id=news>). Leafsnap identifies a tree species by taking a picture of a leaf. The app was created by Columbia University, University of Maryland and the Smithsonian Institution, and funded by a National Science Foundation grant. **John Kress** and **Ida Lopez** headed a group of contractors, volunteers and interns at the Botany Department as the library of leaf images was amassed for the project. The app was



released for public use in May 2011. Since its release, over a million downloads have occurred.

Leafsnap has a library of 185 common species of trees found in the northeastern United States. Along with high resolution images of tree characters, the app offers a brief description of each species, gives a link to the Encyclopedia of Life species page, and simultaneously maps the location where the leaf image is taken. This free app is available for download at the iTunes Store (<https://itunes.apple.com/us/app/leafsnap/id430649829?mt=8>).

Work continues to increase the number of tree species found in Leafsnap.

Exploring the History of Botany

The history of Botany is characterized by great figures such as the Greek Theophrastus (ca. 370-280 B.C.), the German Hieronymus Bock (1498-1554) and Leonart Fuchs (1501-1566), and the French Joseph Pitton de Tournefort (1656-1708) and Carl von Linnaeus (1708-1778), to mention just a few. They are not, however, the only ones who had contributed to the development of botany, from the most remote Antiquity to the present day of plant science. Botany as a discipline was made by a multitude of observers, authors, and illustrators whose names have not been preserved. Their works are hidden in notebooks located in libraries worldwide.

Alain Touwaide and **Emanuela Appetiti** explored several libraries in Athens and Thessaloniki in November and December 2012, searching for books and texts authored by Greek botanists whose identities have been lost through the centuries, from Antiquity through Byzantium between the 5th century BC to 15th AD, and later on in the Ottoman Empire.

Their exploration of these library collections was extremely productive. They found more than 100 volumes that were unknown to the scientific community. They discovered one manuscript, for example, that had representations of plants that had never been noticed by previous scholars.

Touwaide plans to publish the results of their research in the form of a world census of Greek botanical and medical manuscripts that will substantially expand our knowledge of the history of botany

and botanical illustration. His work will provide the resources for a complex reconstruction of the development of botany, illustrating the slow process of accretion generation after generation, with a whole wealth of small, yet relevant observations first transmitted by oral tradition and written down at a certain point in time.

Visitors

Continued from page 3

Sheila Kingsbury, Bastyr University; History of herbal medicine (10/24).

Nora Ruebrook, Omega, Honolulu; Biblical plants (10/30).

Zulima Palacio, Voice of America, Washington, DC; Medicinal plants of Antiquity (10/31).

Lee Kass, L.H. Bailey Hortorium, Cornell University; T.F. Lucy collection and Gillis specimens (11/1-11/7).

Charlie Jarvis, The Natural History Museum, London, United Kingdom; Linnean names (11/2-11/3).

Ana Gabriela Duarte Silva, New York Botanical Garden; *Callicostella* (Bryophyta) (11/19).

Marian Chau, University of Hawaii; Compositae (12/3-12/24).

Jerrold Davis and **Gwynne Lim**, Cornell University; Grasses (12/3-12/4).

Wesley Knapp, Delaware State University; *Juncus* (Juncaceae) and *Rhynchospora* (Cyperaceae) (12/10).

Monica Carlsen, Missouri Botanical Garden; Araceae (12/13-12/14).

Jessica Adiwijaya, Iowa State University; Plant conservation internship (12/17/12-1/11/13).

Danielle Norwood, St. Mary's College of Maryland; Plant conservation internship (12/17/12-1/18/13).

Tina Ayers, Northern Arizona University; Campanulaceae (12/21).

Sean Bradley, Bastyr University; Ancient Chinese medicine (12/21).

Randy Scott, Northern Arizona University; Asteraceae (12/21).

Rodney Dever, West Virginia University; Amaryllidaceae (12/26-12/28).

The 2013 Smithsonian Botanical Symposium, 19-20 April, to Explore Conservation Biology

The Department of Botany and the United States Botanic Garden will convene the 2013 Smithsonian Botanical Symposium, “Avoiding Extinction: Contemporary Approaches to Conservation Science,” to be held at the National Museum of Natural History in Washington, D.C., on 19 – 20 April 2013.

Conservation science seeks to provide a rational framework for the protection of species and their habitats. At the inception of the discipline, scientists recognized that environmental problems, including land use change and pollution effects, were significant challenges to sustaining biodiversity. Scientists now acknowledge that, while these problems remain, other issues such as invasive species, interspecific hybridization, and climate change impose

additional threats to species survival. Furthermore, paleoecologists have used the fossil record to contextualize the current

loss of biodiversity based on knowledge of past extinctions and paleoclimates, and now models of predicted future

climates are helping to anticipate new challenges.

Forty years ago, the U.S. Endangered Species Act was signed into law. This landmark piece of legislation was designed to protect plant and animal species from extinction based on our knowledge of conservation science at the time. The Act has led to many success stories, primarily due to the growing sophistication of the conservation science it spurred, but will not be sufficient on its own to address new conservation goals. With new landmark conservation legislation unlikely in the near future, how will scientists continue to move forward in their quest to preserve biodiversity?

The 11th Smithsonian Botanical Symposium will highlight past efforts and new threats to conservation goals, as well as new approaches underway that promise to safeguard biodiversity both here in the U.S. and around the world. The invited speakers will cover a wide range of endangered organisms, with a special focus on plants, to illustrate the challenges of modern-day conservation science in a rapidly changing world.

In addition, the 11th José Cuatrecasas Medal in Tropical Botany will be awarded at the Symposium. This prestigious award is presented annually to an international scholar who has contributed significantly to advancing the field of tropical botany. The award is named in honor of Dr. José Cuatrecasas, a pioneering botanist who spent many years working in the Department of Botany at the Smithsonian and devoted his career to plant exploration in tropical South America.

A poster session will occur at the opening reception at the U.S. Botanic Garden. Poster abstract submission will begin 1 February at botany.si.edu/sbs/, and continue until 18 March. Space is limited and

will be accepted based upon the quality of the abstract and the order received.

Symposium sponsors include the Department of Botany, the Office of the Associate Director for Research and Collections, the United States Botanic Garden, and the Cuatrecasas Family Foundation.

Registration and additional information about the 2013 Smithsonian Botanical Symposium is available at botany.si.edu/sbs/. You may also call 202-633-0920 or email sbs@si.edu for more information.

Flora of the Guianas Meeting

By Vicki Funk

At the *Flora of the Guianas Consortium* board meeting in Leiden (The Netherlands), 22–23 October 2012, **Christian Feuillet** represented the Biological Diversity of the Guiana Shield Program and the Department of Botany. Vicki Funk interviewed him when he returned.

VF – How did you happen to go to Leiden?

CF – Neither **Pedro Acevedo**, our official representative and member of the board, nor **Vicki Funk**, head of the Biological Diversity of the Guiana Shield Program, could attend the meeting. Around the same time I was scheduled to visit the Paris Herbarium (P) where the Boraginaceae collection was back on the shelves after the herbarium renovation. I was asked to extend my trip and add Leiden to my schedule. In the end I decided the easiest thing to do was to drive from Paris to Leiden. Attending the meeting was a natural thing for me to do since I lived in French Guiana for six years, and have done field work in French Guiana for 32 years. I also represented Cayenne once or twice at previous meetings in the 80s or early 90s. Also I have co-authored two of the fascicles and am working on two others.

VF – Can you describe the changes in the P herbarium?

CF – The four floors of the herbarium have been remodeled and compactors have been installed, as well as an elevator in the mid-section. During that time, all the Angiosperms specimens of the General Herbarium have been scanned and progressively have been made available



DEERINGOTHAMNUS RUGELII

The Florida endemic *Asimina rugelii* B.L. Rob. was listed as Endangered in 1986 under the name *Deeringothamnus rugelii* (B.L. Rob.) Small. Rugel's pawpaw is known only from Volusia Co., Florida, and is at risk of extinction from habitat loss, fire suppression and successional change. Illustration from Small, *Addisonia* 15: pl. 489. 1930.

online. December 2012 saw the completion of the return of the collections on the shelves and placed according to APG III. In January and February, the distribution of empty pigeon-holes will be smoothed, the last major cleaning from the renovation will take place, and the labeling of the aisles will be complete. It is still necessary to check before you go to make sure the family you want to study is available.

VF – Did you find the Leiden meeting useful?

CF – The Consortium is composed of nine institutions, four in Europe and the UK—the Botanic Garden and Museum of Berlin-Dahlem (B), the Museum of Natural History in Paris (P), the University of Leiden (L) & the Royal Botanic Garden in Kew (K)—and five in the Americas, New York Botanical Garden (NY) and the Smithsonian Institution (US) in the USA, and the IRD Center in Cayenne (CAY), the University of Georgetown (BRG) & the University of Paramaribo (BBS) in the Guianas. It is essential for the representatives of each institution to meet periodically to discuss editorial politics and share news about the activities related to the Flora of the Guianas in each group.

VF – What did you discuss that you would like to convey to the Department?

CF – Usually there are few changes, but this year was a bit special. During the last meeting in 2010 at US, the possibility of switching from the Cronquist family classification to APG III was discussed. No decision was made at that time but the board asked P. Delprete (CAY) to evaluate the impact of this possible change on the relevance of the Flora publications and the families being treated and the effect on the ~80 families already published. In Leiden Delprete reported on the issue pointing out that APG reached, with its third version in 2009, a stage they consider final. Further, he felt that a change would cause little disruption and increase the relevance of the publications, especially for colleagues trained after 2000. After the discussion the board unanimously decided to adopt APG III.

VF – So 80 families are published, how many families are left? Is there any projection on when it will be finished? How many have been contributed by the Smithsonian?

CF – Depending on how you organize them there are about 180 families of vascular plants. Most of the flowering plants and nearly all of the Fungi, Lichens, and non-vascular plants remain untreated and progress is slow; there is no way to know when the flora will be finished. The Smithsonian prepared or funded 19 of the family treatments (23–24%):

Series A Phanerogams – Poaceae (E. Judziewick, 1990), Melastomataceae (J. Wurdack, 1993), Aristolochiaceae (C. Feuillet & O. Poncy, 1998), Phytolaccaceae, Nyctaginaceae, Aizoaceae, Chenopodiaceae, Amaranthaceae, Portulacaceae, Basellaceae, Molluginaceae & Caryophyllaceae (R. DeFilipps & S. Maina, 2003), Acanthaceae & Mendonciaceae (D. Waschausen, 2006), Gesneriaceae (L. Skog & C. Feuillet, 2008), Leguminosae subfam. Mimosoideae (R. Barneby, J. Grimes & O. Poncy, 2011) and Sapindaceae (P. Acevedo, 2012).

Series B Ferns and fern allies – Hymenophyllopsidaceae (D. Lellinger, 1991) & Hymenophyllaceae (D. Lellinger, 1994).

VF – Are there other series?

CF – Yes, series C Bryophytes, series E Fungi and Lichens, and another series with two collector indices for Guyana and Surinam and one fascicule dealing with the collecting trips of the Schomburgk brothers.

VF – Who is the editor of the Flora and

where are the volumes published?

CF – The current editor is Sylvia Mota de Oliveira (L) and beginning in 1998 the fascicules have been published by Kew.

VF – What family treatments can we expect in the near future? Are you working on any volumes?

CF – Some treatments are already submitted: Cladoniaceae (H. Sipman & T. Ahti), Dilleniaceae (G. Aymard & C. Kelloff), Meliaceae (T. Pennington & N. Biggs), and Ochnaceae (C. Sastre). I am working on the Boraginaceae and Passifloraceae, and they should be submitted in early and late 2013.

VF – When will the Flora be available online?

CF – The Newsletters of the most recent Board Meetings including the texts of the talks given after the meetings are now online. The plan is to begin to make the family fascicules available online as well. An agreement has already been made with Kew covering the editions published by them, and discussions are underway with Koeltz for the pre-1998 fascicules.

VF – Where and when will the next meeting be held?

CF – The board accepted the invitation of the University of Guyana, so, funding permitting, it should be in Georgetown in 2014.



The treatment of Gesneriaceae for the *Flora of the Guianas* includes *Paradrymonia campostyla* (Leeuwenb.) Wiehler, from Montagne de Kaw, French Guiana. (Photo by Christian Feuillet)

Kamakusa Expedition 2012: First Botanical Exploration of a Remote Guyana Tepui

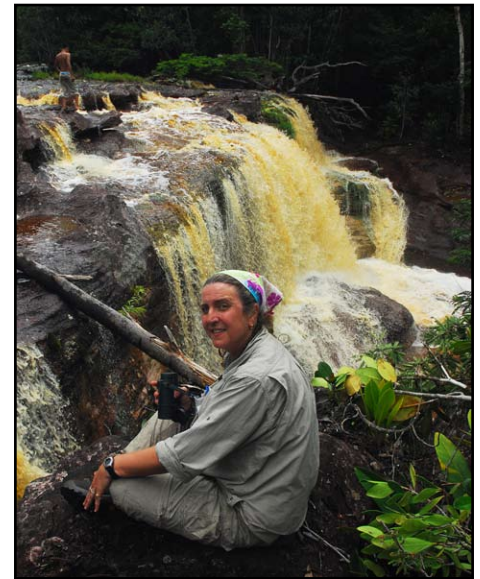
By Kenneth Wurdack, Erin Tripp, Aleksandar Radosavljevic, and Karen Redden

In the 21st century, is there still a frontier of terrestrial wild places that, while within reach of Google Earth, have yet to be touched by scientific exploration, or even human footprints? The Biological Diversity of the Guiana Shield Program (BDG) run by the SI's Department of Botany has sponsored many fieldtrips targeting this scientific frontier in Guyana (e.g., Alexander et al., *Plant Press* 14[1], 2011). On the latest BDG expedition (May-June 2012), supported by the National Geographic Society (NGS/Waitt Grant to Redden, PI), a group of American scientists (i.e., the four authors herein) and Guyanese counterparts undertook the first plant collecting expedition to Mt. Kamakusa in western Guyana.

Kamakusa is significant among Guyanese tepuis (or table mountains) for two notable reasons: (1) the summit (5°52'50.9"N, 60°6'11.7"W; 5,511 feet /1,691 meters elevation) and much of the region surrounding Kamakusa had never been surveyed by biologists nor

even well mapped (due to cloud cover the summit could not be rendered on official topographic maps based on aerial photography); (2) following extensive study of topographic maps, Kamakusa is believed to be the third highest tepui wholly within Guyana after Mt. Ayanganna and the Mt. Wokomung/Morakabang complex, although several higher tepuis border with adjacent Venezuela and Brazil. As such, Kamakusa was expected to harbor species that are rare within Guyana (e.g., montane elements) and representative of endemic Guiana Shield biota.

Mt. Kamakusa lies at the extreme eastern edge of the Pakaraima Mountains, about 18 air miles northeast of the village of Imbaimadai and 14 miles west of the namesake village of Kamakusa. Its east-facing sheer cliffs, with a rapid drop of more than 5,000 feet to the lowland jungle, directly intercept Caribbean tropical trade winds and give rise to an environment that is among the wettest on Earth. The western slopes form the headwaters of the Partang River, a tributary of the upper Mazaruni River, and create a small rain shadow that gives way to an extensive mosaic of savannas, scrub, and



Waterfall on Powis Creek near Camp 2. Redden in foreground spotting plants to collect; Carlos Jacobis in rear above falls. (Photo by Ken Wurdack)

short canopy forests.

While Imbaimadai and its vicinity have been heavily botanized since the 1950s, only Stephen Tillet penetrated portions of Kamakusa (lower slopes), collecting about 40 numbers in 1960. Anthropogenic disturbance traverses portions of lower slopes (to 3,300 feet) in two forms: (1) a relatively recent ATV track that bypasses the impassible lower Partang rapids and terminates at the abandoned Partang Airstrip; and (2) prospector inroads as sporadic overgrown and almost archeological "pork-knocker" camp remnants.

The primary objectives of the 2012 Kamakusa Expedition were twofold: (1) document plant diversity of the region for systematics and floristic studies through general collecting; and (2) provide baseline data for future conservation planning. Expedition participants included a U.S. contingent of Karen Redden (University of the District of Columbia and SI Research Associate), Kenneth Wurdack (SI), Erin Tripp (Rancho Santa Ana Botanic Garden and now University of Colorado, Boulder), and graduate student Aleksandar Radosavljevic (Chicago Botanic Garden and Northwestern University); a Georgetown contingent of Anita and Carlos Jacobis; and an Akawaio Amerindian contingent (Imbaimadai region) of Delph



***Abolboda acaulis* Maguire (Xyridaceae). (Photo by Ken Wurdack)**

Hunter, James Ralph, Dick Hunter, Simon Hunter, Vivian Hunter, Phillip Morris, Leonard Stanley, and Clyde Austin. The expedition party fluctuated between 6-13 members owing to shuttling of supplies forward and collections out, and within the first two weeks, Anita Jacobis and Redden were evacuated due to field illness (they subsequently fully recovered).

Due to Partang rapids and eastern flank cliffs, an overland hiking route from Imbaimadai was required. This route followed the ATV trail to the abandoned airstrip for approximately a quarter of the distance, and then fresh line was cut to the summit (with the aid of compass, topographic maps, GPS, altimeter, and curvimeter to determine the shortest and most feasible route) with a return to Imbaimadai via the same route. In total, the overland route was about 28 miles (45 kilometers), making this one of the longest approaches on foot by any BDG expedition to date.

The U.S. contingent arrived in Georgetown, Guyana on 6 May 2012 and flew to Imbaimadai on 11 May in a Cessna Caravan with the 2,682 pounds of gear, collecting supplies, and provisions needed to support the expedition for four weeks in the field. Picturesque Imbaimadai is situated at the edge of a diverse savanna surrounded by impressive sheer-cliff tepuis. Once a small, sleepy village, it has exploded with development as a gateway



Aerial view of the ridge summit of Kamakusa during the flight out. Western face by which the expedition ascended. (Photo by Erin Tripp)

for prospectors seeking mineral riches (gold and diamonds), and is now served by up to six flights a day of cargo and passengers.

On 14 May, the expedition departed civilization for the first of seven camps eventually required to reach the summit. Gear was moved in backpacks and Amerindian warishis, and camps of plastic tarps over log frames were constructed near creeks for water. Lower elevations of the route traversed recently burned wet savannas rich with Xyridaceae (over 10

species), *Brocchinia reducta* Baker, and *Stegolepis* spp., and drier sandstone outcrops featured dense patches of *Vellozia tubiflora* (A. Rich.) Kunth. As elevations increased, so did wetness and epiphyte diversity.

The summit of Kamakusa was first reached 5 June by the Amerindian contingent cutting line; the U.S. contingent followed and collected on 7-8 June in severe storms. Reaching the summit as day hikes from Camp 7 required a 2.5 hour near vertical scramble of 1,500 feet elevation over 1 linear mile, and traversed three of four total escarpments of the tepui. The exposed rocky summit of Kamakusa was blanketed by a nearly impenetrable shrub thicket dominated by *Bonnetia roraimae* Oliv., interspersed with other high-elevation taxa such as *Weinmannia* spp. Epiphytes were diverse including pleurothallid orchids, striking red-flowered *Utricularia quelchii* N.E. Br. and large *Brocchinia* sp. with tanks hosting the giant *Utricularia humboldtii* R.H. Schomb.

Cold driving rain and high winds cut short each visit to the summit, but 64 collections were made and one brief but spectacular clear view to the lowlands was observed. Camp 7 itself was unpleasantly wet even by rain forest standards, with little sun to dry it out. This camp unexpectedly collapsed on the rainy first night when the camp frame slumped in the saturated muck under the weight of sleeping expedition members. The Camp 7 “mascot” and perhaps the most interest-



Summit of Kamakusa showing dense tepui scrub dominated by *Bonnetia roraimae* Oliv. Left to right: Radosavljevic, Tripp, Wurdack. (Self-timed photo by Ken Wurdack)

Continued on page 10



Pera bicolor (Klotzsch) Müll. Arg. (Peraceae). Yellow pseudanthia with enveloping bracts that open by a narrow slit to allow pollinator access to staminate flowers. (Photo by Ken Wurdack)

Kamakusa

Continued from page 9

ing animal observed on the expedition was a giant turquoise-colored montane earthworm (cf. *Andiorrhinus meansii*, but perhaps a new species), the thickness of a garden hose.

Expedition members returned to Imbaimadai 12-13 June and enjoyed a day collecting along the nearby Karowrieng River. The U.S. contingent returned to Georgetown 16 June and after organizing collections and export permits, returned home 23 June.

Over 1,100 collections (two-thirds vascular plants and one-third cryptogams) in duplicates of 1-6 were made under Redden, Wurdack, or Tripp numbers. These collections reflect plant and lichen diversity ranging from small to large-bodied species (e.g., mosses to canopy trees). Vascular plants were field preserved in alcohol and dried at the Smithsonian; cryptogams were air dried in the field, which necessitated rare sunny days to prevent their molding. These collections span the range of elevations encountered (1,600-5,511 feet), thus making the set a representative, albeit incomplete, reflection of botanical diversity of Kamakusa.

At least three undescribed species are among the collections, although many more will emerge from the cryptogams, which have never been studied from the

region. Notable among these three is a new species of *Tryssophyton* (Melastomataceae), an attractive tuberous epiphyte with whorled leaves and bright purple flowers that appears to be endemic to the summit. The only described species in the genus, *T. merumense* Wurdack, is also only known from the Pakaraima Mountains and was collected during the expedition at lower elevations on Kamakusa.



Catostemma durifolius W.S. Alverson (Malvaceae); collection held by James Ralph. (Photo by Ken Wurdack)

Connecting Users with Field Book Content

By Emily Hunter, Field Book Project

In December, the Field Book Project launched thousands of field book records through the Smithsonian's Collection Search Center <http://ow.ly/gebCH>. After two years of cataloging efforts funded through the Council on Library and Information Resources, records describing over 6,000 individual field books spanning over 500 collections by hundreds of individuals are now freely available online. Of these there are 1,825 botanical field book records representing almost one third of the Smithsonian's cataloged field book holdings. A selection of the records includes links to digitized field books with more digitized content to be added. Prominent botanical field book collections include:

- Mary Agnes Chase, 1906-1959
- Cinchona Project, 1938-1965
- Frederick Coville, 1890-1924
- David Griffiths, 1897-1923
- F. Raymond Fosberg, 1931-1993
- Albert Spear Hitchcock, 1905-1918
- Ellsworth Paine Killip, 1915-1958, and undated
- Joseph Francis Rock, 1920-1929
- Joseph Nelson Rose, 1887-1917
- Thomas R. Soderstrom, 1958-1987

As with other Smithsonian content available through Collections Search Center, users have the ability to contribute tags to these records. Through tagging users may offer their subject knowledge on records for field books, collections, persons, organizations and expeditions.

In addition to the recent publication of these records, the Field Book Project has been promoting field book content via the blog, <http://nmnh.typepad.com/fieldbooks/>, as well as social media sites Flickr and Twitter. Social media reaches new audiences in an ongoing conversation about these collections. The Field Book Project blog posted its first article in March 2011; it now has a cumulative 189 posts, over 39,000 page views, and more than 100 comments. Blog articles highlighting field book content are posted about twice per week, and generate a substantial amount of traffic. Posts high-



Man standing in a field with grasses and trees, possibly André Goeldi in Brazil. This photograph is included in the field notes of Goeldi and part of a collection that includes 36 black-and-white photographs of specimens. Goeldi was a Brazilian botanist who collected in Pará, Brazil, circa 1913-1920.

lighting botanical field books, expeditions, collections, and botanists account for approximately 50 of the Project's blog posts (<http://nmnh.typepad.com/field-books/botany/>).

Flickr is a photo-based social media platform to share images of field book content with an audience that is visually-oriented. The Field Book Project regularly contributes images to the Smithsonian's Flickr Commons photo stream <http://www.flickr.com/photos/smithsonian/>. Three sets of images focus on botanical field work: Albert Spear Hitchcock field notes, Mary Agnes Chase field notes, and André Goeldi field notes.

Twitter provides an informal platform for the Field Book Project (@Fieldbook-proj) to reach out to a huge community of active content creators in the fields of biodiversity, museums, archives, libraries, natural history, and more. Through this network individuals can be reached who might not have otherwise heard of the Project. Botanists and plant enthusiasts make up a significant portion of the Twitter following which continues to grow.

While increased exposure for the Field Book Project is important, engaging with social media is not just about pushing content out towards new audiences. It is also about opening up a dialogue. Over the past two years guest bloggers have been invited to offer their insights on field

books. Guests have included Smithsonian staff external to the Field Book Project, as well as colleagues from other museums, schools, and herbaria. Posts contributed by individuals outside of the Project bring new and different perspectives, questions, and ideas, as well as help all of us better understand the potential of field books.

Flickr and Twitter also expand the conversation around field books. On Flickr, users can tag images, "favorite" them, add them to galleries, and comment. Comments range from appreciation to questions about the collections to identifications of plant specimens. Via Twitter, users can ask questions, give feedback, and share this content with others.

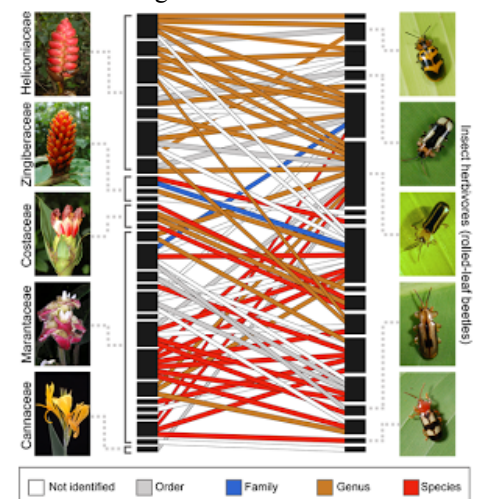
As the Project moves forward, it is more important than ever to promote the fruits of cataloging and digitization labors. The public release of field book records through the Smithsonian's Collection Search Center not only makes it easier for Smithsonian staff to find related field book content, it opens up these collections to a much broader, international audience. Sharing this content via social media outlets broadens awareness of field books as research resources and opens up a dialogue about field book content. The dialogue is still in the early stages, but we encourage you to join in, and to follow us!

Plant-herbivore Network Reconstructed Using DNA Barcodes from the Gut

Plants, together with insect herbivores, represent more than 50% of all known species on earth. To better understand these ecological and evolutionary interactions and how they create and maintain biological diversity we need to determine the associations and networks between insect herbivores and their host plants.

Researchers at the Department of Botany (Carlos García-Robledo, W. John Kress and David L. Erickson), in collaboration with the Department of Entomology at Smithsonian (Charles L. Staines and Terry L. Erwin) tested a DNA Barcoding based alternative to determine insect-host plant associations for an entire guild of insect herbivores using plant DNA extracted from insect gut contents. In a two-year study of tropical plants in the order Zingiberales and their herbivores, rolled-leaf beetles, it was found that by collecting about four insect herbivores representing each plant-herbivore interaction, it is possible to reconstruct the entire plant-herbivore network.

This study demonstrates that host plant identifications at the species-level using DNA barcodes are feasible, cost-effective, and reliable, and that reconstructing plant-herbivore networks with these methods will become the standard for a detailed understanding of these interactions.



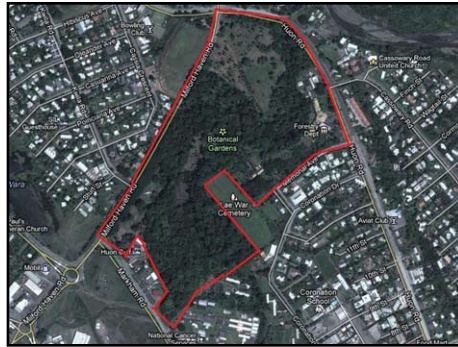
Zingiberales and rolled leaf beetle network reconstructed using DNA barcodes.

Papua New Guinea

Continued from page 1

The herbarium is collaborating with the National Herbarium of New South Wales (NSW) on the project Plants of Papua New Guinea (<http://www.pngplants.org>). The project produces and updates the PNG plants database, an internet accessible herbarium plant collection database of plants from Papua New Guinea, which is an essential resource to botanical researchers, foresters, conservation biologists, as well as the general public.

New Guinea represents one of the world's richest botanical hotspots with a high level of endemism. As we were primarily collecting Vitaceae and *Melicope* of Rutaceae, we focused on forest habitats in two provinces: Morobe and Eastern Highlands. In the areas we traveled, the forests are mainly tropical humid forests, with trees dominated by species from plant families such as Rubiaceae, Fagaceae, Lauraceae, Meliaceae, Annonaceae, Sapotaceae, Euphorbiaceae, Podocarpaceae and Fabaceae. We started to collect in the tropical lowland forests near Lae, in several nearby villages of Salamaua, Yalu, Oomsis, Gabensis, as well as the natural forests of the Lae Botanic Gardens. Then we collected in several



Aerial view of the Lae Botanical Garden showing its location in the center of town (Eriku on the top left; Top Town on the bottom right).

mid-montane forest areas in Wau, Bulolo and adjacent areas. After some successful journeys in Morobe province, we spent a week in the Eastern Highlands province, primarily around Goroka, the capital of the province, and also the Mt. Michael area and Kainantu. We really enjoyed each day of our journey, but the days collecting in the Wau region were especially productive. It was pretty amazing to encounter and collect so many species of *Melicope*, *Tetrastigma* and *Cissus* growing in such a relatively small area. We look forward to seeing our phylogenetic results on these species in one region to figure out their assembly and diversification histories. The

Mt. Michael region does not seem to be botanically that well-known. Mt. Michael harbors very rich montane forests, which seem to be very species rich. The forests above 2,000 meters are well preserved and pristine, but those below 2,000 meters near villages have been developed into gardens of bananas, sweet potatoes, and coffee plantations. Certainly, the Mt. Michael area deserves attention for conservation.

The Wau area of Morobe province is botanically well-known with many plant collections made by various collectors. We explored the areas around Mt. Kolorong and Mt. Kaindi. It was very heart-breaking to observe that the botanically well-known localities near Wau, such as the slopes and summit of Mt. Kaindi and the Edie Creek area, are only covered by remnant patchy forests because of the heavy mining in Mt. Kaindi. The mining activities are certainly the most direct threat to these rich forests. The mining has also brought in many people from outside into Mt. Kaindi and the population growth has led to development of numerous patchy gardens, which has destroyed the natural forests on the mountain slopes to the summit area. Mining seems to be a major threat to biodiversity in Morobe province.

Throughout our journey we used extensively the public transportation known as PMVs (public motor vehicles), which are mostly small buses or trucks. Prior to our trip we heard mixed messages on using PMVs by foreign travelers and expats. Nevertheless, we really enjoyed interacting with the locals in our travel throughout the Morobe and Eastern Highlands provinces. Indeed both of us are experienced travelers and were very careful. We also used the local banana boats to get to and travel back from Lae to Salamaua village. Overall it felt rewarding getting to know PNG by the use of public transportation instead of isolating ourselves in SUVs or rental trucks. Renting SUVs or trucks in Morobe province is also rather expensive. The price can be about US\$200 to \$400 per day, which is over the work budget for most botanists. Vehicle rental is especially expensive in the Lae area, which is perhaps the must-stop for botanists since the LAE herbarium is there. Lae is certainly our main transportation hub, as our botanical colleagues are there and the herbarium is available for drying collections and identifying plants. We were able to save some travel funds by renting



The LAE herbarium showing cabinets and a working bench. (Photo by Marc Appelhans)



Impression of the natural forest area in the Lae Botanic Gardens. (Photo by Marc Appelhans)

vehicles more locally away from Lae, such as in Wau and Goroka, after getting there by PMV.

We were struck by the very expensive hotels and lodging in PNG. Initially we budgeted about \$40 per person per day. Very average lodging with a simple room without air-conditioning ranges from \$50 to \$100 in Morobe and Eastern Highlands provinces. To keep costs down, we looked for places where we can stay and cook for ourselves, or at least boil some ramen noodles, which are readily available throughout PNG. We had so many ramen noodles on the trip that both of us agreed never to eat them again unless it is absolutely necessary on another botanical mission! After the first two weeks, we were able to travel much more cheaply by reducing the food cost, with the savings going into lodging and local guides. The latter was relatively expensive as well, depending upon where we were. Overall, we learned a lot about traveling in PNG on a botanist's budget.

During our journey, we met wonderful colleagues, especially in Lae and Bulolo. The local folks in villages were also very friendly and helpful. We met several local villagers who had excellent knowledge about the plants surrounding them. One village chief/elder, Sam, in the village of Gabensis was especially resourceful. It

was a real joy to meet and learn from him and his family on how they use and protect their forests. We met two chiefs on our trip and both have extensive knowledge on the forests. In PNG, tribal land ownership is well maintained and also protected by the law.

We usually obtained permission from land-owners and paid the appropriate fees before entering the forests. In general, we were very well received and guided by the villagers, who often offered us coconuts to drink and bananas or sweet potatoes (*kaukau*) as a snack. *Kaukau* is the most important crop in the country. After an exhausting hike to Mt. Michael, the freshly cooked *kaukau* was a very welcome reward and will stay in our memories for a long time. Another very common agricultural produce is betel nuts (fruits of the palm *Areca catechu*) which are sold at almost every street corner. A young woman who was waiting with us at the PMV stop together with her husband had six large bags of betel nuts. She explained that she makes a good profit transporting and selling betel nuts produced in the lowlands in the higher altitude areas. We often encountered signs saying “*noken kaikai buai*” (chewing betel nut is not allowed), but the omnipresent red spots on the roads and the red-colored teeth of many people are a clear indicator that these signs are largely ignored.

It was great to collect plants in Papua New Guinea, to see such a rich flora, and to get to learn about the fascinating culture. It was also heart-breaking to see numerous mining sites in Morobe province and the many short-lived gardens

Continued on page 14



The authors and the staff of LAE herbarium. Left to right: Marc Appelhans, Bernard Sule, Haydrian Morte, Kana Kevin, Balpina Tiki, Kipiro Damas, Michael Lovave, Robert Kiapranis, Jun Wen, and Thomas Magun. (Self-timed photo by Marc Appelhans)



Pristine cloud forest on the slopes of Mt. Michael (Eastern Highlands Province). (Photo by Marc Appelhans)

Papua New Guinea

Continued from page 13

and coffee plantations near villages in areas where we traveled. Mt. Kaindi is a protected area, but the conservation management is at a minimum. New Guinea is home to the third largest rain forest in the world, only after the Amazon and Congo. More resources need to be invested in biodiversity conservation in PNG. Mining should be better regulated. It is a clear dilemma between biodiversity conservation and economic development. The people in Wau are pleased with the revived gold rush to town. Yet the mining companies should pay more attention to conservation, at least by setting aside sizable areas for conservation purposes.

In the context of conservation and public education, we see the special role the Lae Botanic Gardens can play. The excellent natural tropical lowland forests in an easily accessible urban setting make it an ideal conservation and education tool. During our talks with our colleagues, we learned that the Garden needs more support from the biodiversity community. We would like to call for support for an effort to inventory the natural forests in the Lae Botanic Gardens. If you are interested in donating toward this effort, feel free to contact Jun Wen by email at wenj@si.edu.

Publications

Coelho, A., K. Morais, **H. Laughinghouse IV**, S.J. Giacomini and S.B. Tedesco. 2012. Pollen grain viability in accessions of *Crotalaria juncea* L. (Fabaceae). *Agrociencia* 46: 481-487.

García-Robledo, C., D.L. Erickson, C.L. Staines, T.L. Erwin and W.J. Kress. 2013. Tropical plant–herbivore networks: recon-

structing species interactions using DNA barcodes. *PLoS ONE* 8(1): e52967. <http://dx.doi.org/10.1371/journal.pone.0052967>

Giussani, L.M., A.M. Antón., M.A. Negritto, A.A. Romanutti and **R.J. Soreng.** 2012. *Poa* L., pp. 284-339. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 2, Monocotyledoneae, Poaceae: Pooideae.* Graficamente Ediciones, Cordoba.

Kling, H.J., **H.D. Laughinghouse, J. Smarda, J. Komarek, J. Acreman, K. Bruun, S.B. Watson and F. Chen.** 2012. A new red colonial *Pseudanabaena* (Cyanoprokaryota, Oscillatoriales) from North American large lakes. *Fottea* 12(2): 327-339.

Mitchell, A., R. Li, J.W. Brown, I. Schönberger and **J. Wen.** 2012. Ancient divergence and biogeography of *Raukua* (Araliaceae) and close relatives in the southern hemisphere. *Aust. Syst. Bot.* 25(6): 432-446. <http://dx.doi.org/10.1071/SB12020>

Molina, J.E., **J. Wen** and L. Struwe. 2012. Systematics and biogeography of the non-viny grape relative *Leea* (Vitaceae). *Bot. J. Linn. Soc.* <http://dx.doi.org/10.1111/j.1095-8339.2012.01320.x>

Nash, M.C., B.N. Opdyke, U. Troitzsch, B.D. Russell, **W.H. Adey, A. Kato, G. Diaz-Pulido, C. Brent, M. Gardner, J.**



Large multi-trunked fig tree in the lowland rain forest in the Yalu area (Morobe Province). (Photo by Marc Appelhans)

Prichard and D.I. Kline. 2012. Dolomite-rich coralline algae in reefs resist dissolution in acidified conditions. *Nature Climate Change* <http://dx.doi.org/10.1038/nclimate1760>

O'Grady, P.M., G.M. Bennet, V.A. Funk and T.K. Altheide. 2012. Retrograde biogeography. *Taxon* 61: 702-705.

Peterson, P.M. 2012. Clave de las Tribus de Chloridoideae, p. 76. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 1, Monocotyledoneae, Poaceae: Aristidoideae a Pharoideae*. Graficamente Ediciones, Cordoba.

Peterson, P.M. 2012. Clave de los Generos de Chloridoideae, pp. 76-78. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 1, Monocotyledoneae, Poaceae: Aristidoideae a Pharoideae*. Graficamente Ediciones, Cordoba.

Peterson, P.M. 2012. Tribu Chlorideae Martinov, p. 79. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 1, Monocotyledoneae, Poaceae: Aristidoideae a Pharoideae*. Graficamente Ediciones, Cordoba.

Peterson, P.M. 2012. Tribu Eragrostideae Stapf., p. 175. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 1, Monocotyledoneae, Poaceae: Aristidoideae a Pharoideae*. Graficamente Ediciones, Cordoba.

Peterson, P.M. 2012. Tribu Zoysieae, p. 204. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 1, Monocotyledoneae, Poaceae: Aristidoideae a Pharoideae*. Graficamente Ediciones, Cordoba.

Peterson, P.M. and D. Giraldo Canas. 2012. *Eragrostis* Wolf, pp. 178-203. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 1, Monocotyledoneae, Poaceae: Aristidoideae a Pharoideae*. Graficamente Ediciones, Cordoba.

Peterson, P.M. and D. Giraldo Canas. 2012. *Muhlenbergia* Schreb., pp. 140-154.

In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 1, Monocotyledoneae, Poaceae: Aristidoideae a Pharoideae*. Graficamente Ediciones, Cordoba.

Peterson, P.M. and D. Giraldo Canas. 2012. The genus *Eragrostis* (Poaceae: Chloridoideae) in northwestern South America (Colombia, Ecuador, and Peru): morphological and taxonomic studies. *Biblioteca Jose Jeronimo Triana* 24: 1-195.

Piccini, F., V. Frescura, **H. Laughinghouse IV**, N.B. Perez, O.B. Machado and S.B. Tedesco. 2012. Pollen viability of genotypes of *Eragrostis plana* from different geographic populations in Rio Grande do Sul, Brazil. *Enciclopedia Biosfera* 8(15): 1316-1324.

Sherwood, A.R., O. Necchi Jr, A.L. Carlile, **H. Laughinghouse IV**, S. Fredericq and R.G. Sheath. 2012. Characterization of a novel freshwater gigartinales red alga from Belize, with description of *Sterroclaida belizeana* sp. nov. *Phycologia* 51(6): 627-635.

Shi, W., **J. Wen** and **S. Lutz**. 2012. Pollen morphology of the *Maddenia* clade of *Prunus* and its taxonomic and phylogenetic implications. *J. Syst. Evol.* <http://dx.doi.org/10.1002/jse.233>

Soreng, R.J. 2012. Clave de los Generos de Pooideae, pp. 25-31. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 2, Monocotyledoneae, Poaceae: Pooideae*. Graficamente Ediciones, Cordoba.

Soreng, R.J. 2012. Clave de los Tribus de Pooideae, p. 24. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 2, Monocotyledoneae, Poaceae: Pooideae*. Graficamente Ediciones, Cordoba.

Soreng, R.J. 2012. Tribu Poeae R. Br., pp. 97-102. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 2, Monocotyledoneae, Poaceae: Pooideae*. Graficamente Ediciones, Cordoba.

Soreng, R.J. and L.M. Giussani. 2012.

Nicoraepoa Soreng & L.J. Gillespie, pp. 270-277. In F.O. Zuloaga, Z.E. Rúgolo de Agrasar and A.M. Anton, eds. *Flora Vascular De La Republica Argentina, Volume 3 Tomo 2, Monocotyledoneae, Poaceae: Pooideae*. Graficamente Ediciones, Cordoba.

Touwaide, A. 2012. Printing Greek medicine in the Renaissance. Scholars, collections, opportunities, and challenges introduction. *Early Sci. Med.* 17(4): 371-377. <http://dx.doi.org/10.1163/1573382320120001>

Xi, Z., R.K. Bradley, **K.J. Wurdack**, K.M. Wong, M. Sugumaran, K. Bomblies, J.S. Rest and C.C. Davis. 2012. Horizontal transfer of expressed genes in a parasitic flowering plant. *BMC Genomics* 13: 227. <http://dx.doi.org/10.1186/1471-2164-13-227>

Xi, Z., B.R. Ruhfel, H. Schaefer, A.M. Amorim, M. Sugumaran, **K.J. Wurdack**, P.K. Endress, M.L. Matthews, P.F. Stevens, S. Mathews and C.C. Davis. 2012. Phylogenomics and a posteriori data partitioning resolve the Cretaceous angiosperm radiation Malpighiales. *Proc. Natl. Acad. Sci. USA* 109(43): 17519-17524. <http://dx.doi.org/10.1073/pnas.1205818109>

Zhu, W., Z. Nie, **J. Wen** and H. Sun. 2012. Molecular phylogeny and biogeography of *Astilbe* (Saxifragaceae) in Asia and eastern North America. *Bot. J. Linn. Soc.* <http://dx.doi.org/10.1111/j.1095-8339-2012.01318.x>



Art by Alice Tangerini

***Ficus sangumae* Weiblen & Whitfeld**

In 2010, Timothy J. S. Whitfeld and George D. Weiblen described five new species of *Ficus* (Moraceae) from the lowland rain forests of Papua New Guinea, including *Ficus sangumae* (*Harvard Papers in Botany*, 15:1-10). This illustration of *F. sangumae* came about when Alice Tangerini was asked to teach a botanical illustration class at the Minnesota School of Botanical Art in Minneapolis. Weiblen supplied herbarium specimens for the class to draw provided he could use them in his publication. Tangerini used her drawing of the Type of *F. sangumae* as the teaching model for the class. It was published as part of the group of illustrations done by class members.



Smithsonian
National Museum of Natural History

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

Official Business
Penalty for Private Use \$300