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where science and nature converge

IN THIS ISSUE

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The Convention on Biological Diversity

by Kerry ten Kate[1] and W. John Kress[2]

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The Convention on Biological Diversity (CBD) was opened for signature at the 1992 Earth Summit in Rio de Janeiro. As of 2004, 188 countries and the European Union have ratified the Convention. The Convention, which is administered by the United Nations Environmental Program (UNEP), is perhaps the most far-reaching international agreement on biodiversity ever authored. Its provisions and its effective implementation directly concern virtually every scientist working in tropical habitats. In this article, we attempt to summarize the Convention and to provide a perspective on how this regulatory tool is undergoing change as it is implemented in various settings across the globe.

The Convention is constantly evolving. Since 1992, the signers of the Convention (the "Parties") have made important commitments to implementation of its articles through the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA) and the primary political decision-making body, the biennial Conference of the Parties (COP). The full text of the Convention is available at http://www.biodiv.org. The Parties have adopted a Global Taxonomy Initiative, Guiding Principles on Invasive Alien Species, a Global Strategy for Plant Conservation and Guidelines for the Sustainable Use of Biodiversity, among many other science-based tools. National biodiversity strategies required by the CBD have been undertaken in 150 countries and the CBD's financial mechanism, the Global Environment Facility, has allocated billions of dollars to developing countries to implement the CBD (ten Kate 2002).

Despite these achievements, the CBD, unlike its climate change cousin, generally does not contain timetables and targets. Recently, however, the Parties agreed on an ambitious but achievable Strategic Plan for the Convention, with the purpose of effectively reducing the loss of global biodiversity by 2010. In addition, the adoption of the Global Strategy for Plant Conservation, with its 16 targets, established a helpful precedent for quantified targets at the international and national levels.

If it is to be successful, the CBD's fundamental contribution to science must be to conserve the resource-base for life sciences (and life itself): namely biological diversity. Treaties are agreements between states, but by and large it is organizations, and not governments, that are equipped to do the actual work of conservation. The CBD offers a bargaining chip to universities, research institutes, commercial enterprises, and communities. In return for helping governments achieve their commitments, scientific organizations can participate in national policy-making, raise their own political profiles, derive a fresh mandate and renewed legitimacy for their work, and

perhaps use the CBD as a lever to help fund their work. As individual countries implement CBD work programs, apply COP guidelines, and execute national strategies, the influence of the CBD on science is likely to grow. One mechanism will be the allocation of public funding; another, the advent of laws and policies that control the direction and methodologies of scientific research.

A significant example of policy that is already influencing science is the regulation of access to genetic resources and benefit-sharing. It is a fact that the world's biodiversity is found in roughly inverse proportion to its scientific and technological capacity (Macilwain 1998). Behind the measured text of the CBD lies the hope of a "grand bargain" (Gollin 1993), in which biotechnology-rich countries compensate biodiversity-rich countries for access to their genetic resources leading to valuable new products, creating sustainable livelihoods for people living near centers of biodiversity, boosting the provider-country's gross national product, and paying for conservation along the way. The CBD sets out provisions according to those states that regulate access to genetic resources. In response to the CBD, some 100 countries, largely those that are home to the bulk of the world's biodiversity, have introduced, or are now considering, laws that regulate access by scientists to genetic resources, biochemicals, and associated traditional knowledge. These laws typically require national and foreign scientists alike to obtain permission for access to biodiversity and to work with partners from the countries providing the genetic resources, and in the process sharing benefits such as royalties, technology, joint research, and information.

As defined in the CBD, "genetic resources" are any material of plant, animal, microbial, or other origin containing functional units of heredity of actual or potential value. Access to this significant chunk of life (humans are excluded) is vital for education and research in the life sciences, as well as for research on the conservation and sustainable use of biodiversity. Access also underpins commercial discovery and development. Global sales of products derived from genetic resources (pharmaceuticals, botanical medicines, major crops, horticulture, crop protection products, cosmetics and personal care products, and a broad range of biotechnologies) in 1999 ranged from US$500 billion to $800 billion (ten Kate and Laird 1999).

The CBD seeks to balance the sovereignty and the authority of national governments with the obligation for states to facilitate access to genetic resources for environmentally sound purposes. Access is to be subject to governments' prior informed consent on terms, mutually agreed by the provider and recipient, that promote the fair and equitable sharing of benefits. Similarly, subject to national law, access to the knowledge, innovations, and practices of indigenous and local communities requires the prior approval of the holders of that knowledge.

Scientists, communities, governments and business have watched the development of international policy and national laws in this field with interest to see whether the goals of facilitating science, respecting rights, and ensuring fairness have been achieved. Overall, partnerships are indeed becoming fairer. Biological samples and the rights to use genes and compounds have been exchanged, sometimes under agreements, for decades. In the wake of the CBD, benefit-sharing agreements are increasingly common. Most benefits have flowed to local scientific institutions in the form of training and technology.

The story is not one of unalloyed success, however. First, commercial demand for access is unreliable. Over the past 30 years, interest in accessing biodiversity for pharmaceutical development has been cyclical. In many sectors, research dollars are flowing out of natural products and into synthetic chemistry for rational drug design, combinatorial approaches, and genetics that focus largely on human material. A goal in many national biodiversity strategies is to help alleviate poverty, to support sustainable livelihoods, and to raise living standards. Countries might do well to use the untapped potential for research on genetic resources to meet domestic needs, for example, through low-cost botanical medicines, rather than seeking only to supply fickle international markets. They could also ensure that regulations distinguish between commercialization and the more steady demand for access for vital conservation research in fields such as ecology and systematics.

Second, benefits are not always forthcoming to countries facilitating access to genetic resources. Much genetic material used for research and development is obtained from collections made before the CBD entered into force for which there are generally no benefit-sharing arrangements. Any benefits that are negotiated rarely "trickle down" to local communities or to conservation. Scientific organizations tend to benefit most, although in a knowledge-based sense rather than an economic one. Countries could require a certain proportion of benefits to be dedicated to conservation, as Costa Rica and Western Australia have done. Countries could also adapt growing experience with trust funds and other mechanisms to ensure that local people benefit and have an incentive to support conservation measures.

Third, evidence is growing that the anticipated bureaucracy, delay, and expense of compliance with the first wave of access laws have deterred foreign and domestic scientists and thus have unwittingly stifled not only commercial research, but also essential conservation work. Confusion over which government bodies are authorized to grant access to genetic resources has not helped.

Encouraging on-going developments, however, provide a growing acknowledgement of the need for a more strategic and flexible approach. In 2002, the Parties to the CBD adopted the Bonn Guidelines on Access and Benefit-Sharing. These recommendations provide guidance to countries in the development of law and policy on access to genetic resources, associated traditional knowledge and benefit-sharing, and to stakeholders such as university researchers, companies and communities in the negotiation of access and benefit-sharing agreements. The Guidelines encourage countries to take a strategic and flexible approach. They set out provisions on prior

informed consent and mutually agreed terms and list key elements of the roles and responsibilities of countries and organizations as they provide and use genetic resources and associated traditional knowledge. They also contain suggestions on administrative aspects such as a national focal point for each country and potential functions of any competent national authorities established by governments to regulate access.

In addition, a range of individual companies, professional associations, gene banks such as botanic gardens, and indigenous communities' groups have developed institutional policies in line with the CBD that provide principles and practical guidance for their employees and associates (Laird 2002). An example is the set of Principles on Access and Benefit-Sharing for Participating Institutions, in which 28 botanic gardens and herbaria from 21 countries, led by the Royal Botanic Gardens, Kew, developed common standards on access to genetic resources and benefit-sharing (Latorre et al. 2001)

Thus, provisions of the CBD are finding their way into national laws and policies and into the working practices of scientists. Scientists can and do participate in guiding and developing international and national law. However, scientists can have more input to the treaty by lobbying or joining national government delegates, by participating as nongovernmental organizations at meetings, and by serving on expert panels. Scientific organizations can become accredited and attend meetings of the CBD's COP and SBSTTA. Such participation is vital to ensure that the treaty is based on sound science and promotes, rather than hinders, conservation. Scientific organizations can also participate in the implementation and evolution of the Bonn Guidelines on Access and Benefit Sharing (for example, by endorsing the Principles for Participating Institutions), so that regulations on access to genetic resources world-wide facilitate science and support fair partnerships. The knowledgeable and rational voices of biologists need to be heard on the broad range of scientific and technical issues covered by the CBD. Finally, scientific organizations should also work with federal, state, and local governments to ensure a coordinated approach for consistent decisions in the broad range of environmental agreements under the auspices of the United Nations, as well as with commercial issues in the World Trade Organization.

The Convention on Biological Diversity marked a turning point in the understanding, conservation, utilization, and sharing of the planet's biological riches. Its entry into force in 1993 was a pivotal event in ensuring that governments and members of civil society take responsibility for the quality of the air we breath, the water we drink, and the conservation of the plants and animals of the Earth. The concerted effort of scientists, communities, and corporations, as well as governments, will be needed to achieve the vital goal of the Convention's strategic plan: namely, to halt the global loss of biodiversity.

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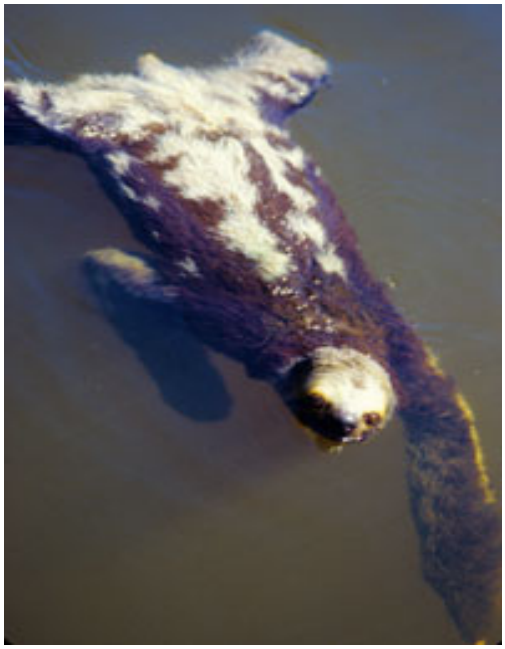

AMAZON CONSERVATION ASSOCIATION FIELD RESEARCH GRANTS

The Amazon Conservation Association offers grants at three levels: 1) for Peruvian undergraduates working towards licenciatura theses; 2) for graduate students of any nationality working towards master's, doctoral, or diplom arbeit degrees; and 3) for established researchers of any nationality seeking to start a long-term research program. ACA welcomes proposals in biology, hydrology, geology, resource use, and related fields. Fieldwork must be carried out in the vicinity of the Los Amigos biological stations (see station profile in this issue of Tropinet). Awards cover travel, field station costs, and equipment, but not tuition. The annual deadline for undergraduate and graduate grants is September 15; seed grant proposals are accepted year-round. Application details and a list of past awards are available at www.amazonconservation.org/home/grants.htm

PALM READING

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A review of Henderson, A. 2002. **Evolution and Ecology of Palms**. The New York Botanical Garden Press, New York. 259 pp with black and white photographs and line drawings. ISBN 0-89327-444-5. $35.00 (pbk) + ~600 references.

You needn't be a palm reader to predict that a book or monograph written by Andrew Henderson will offer both detail and synthesis reflecting his comprehensive knowledge of palms. What will undoubtedly please and possibly surprise readers of this small volume, however, is its success on four counts.

First, it provides an overview of variation within and among 16 major groups (admittedly not all monophyletic) of palms, based on Moore's (1973) classification (with the addition of the cocosoids being split into nonspiny and spiny taxa). Each group is evaluated with respect to an array of attributes of interest to both systematists and ecologists, including stem growth and development rates; stem size and shape; leaf morphology, number, and longevity; inflorescence structure; phenology and frequency of reproduction; pollination biology; breeding system; interactions with animals; germination behavior; and habitat preferences. This overview offers broad generalizations where possible, highlighted by detailed examples that either confirm them or provide notable exceptions. As both a cosmopolitan field biologist and a monographer, Henderson recognizes that it is not only the most common, or the mean, phenotype of a taxon that gives one a feel for the organism, but also the range of phenotypes exhibited for any given trait. Consequently, he is careful to pay as much attention to the curious morphological, developmental, or behavioral phenotypes exhibited by unusual members of each group of palms as to the more typical ones.

A second achievement of this volume derives from the fact that due to their dominance in many rainforests, their diversity, their economic importance, and – let's face it – their charisma, enough palm species have now been both described in sufficient detail and observed in the field to provide a wealth of ecological, developmental, life history, and morphological data with which to address both ecological and evolutionary questions. To date, tackling questions concerning, for example, the sequence of trait evolution, the coevolution of multiple traits, or the identification of traits that promote diversification has been hindered by the absence of well-resolved phylogenies throughout the Arecaceae.

Henderson acknowledges this constraint but does not let it prevent him from making the best of a disappointing situation. He uses one of the many comparative methods available to detect significant correlations and associations among traits and attributes while controlling statistically for similarities among closely related species. This approach enables him to identify combinations of traits that may represent the outcome of adaptive evolution; the effects of pleiotropy or strong genetic linkage; or developmental processes that affect multiple traits. For example, among 56 species distributed across 14 major groups, the number of leaves in the crown is positively correlated with leaf production per year, which would seem obvious and inevitable until Henderson points out the exceptions. Among the qualitative associations described, pollination systems tend to cluster at the ends of a continuum characterized at one extreme by beetle-pollinated, synchronously flowering, protogynous, nectarless species with condensed inflorescences and closely spaced, large, and often unisexual flowers, and at the other extreme by bee/fly/wasp-pollinated, asynchronously flowering, nectar-producing species with elongate inflorescences and loosely spaced, small, protandrous, and often bisexual flowers. Interestingly, within beetle-pollinated genera, stem diameter tends to be significantly positively correlated with the size of leaf and inflorescence parts, while among bee/fly/wasp-pollinated congeners, these

Photo by Jimmy Grogan

correlations are much weaker. While some might consider the quantitative analyses to be premature due to the many phylogenetic uncertainties, they reveal tantalizing patterns that cry out for causal evolutionary explanations. My hope is that these analyses will motivate future work to resolve phylogenetic relationships that will then allow a more refined analysis.

Two additional high points of this book are that, where phylogenetic information permits, Henderson identifies plesiomorphic vs. apomorphic trait states; and, throughout the text, Henderson interprets variation among palms in the context of current ecological concepts and recent field studies. As an

added bonus, an Appendix includes raw data (and cites the publications from which they are drawn) on 13 morphological, reproductive, and habitat attributes of 1245 species (organized by major group), although of course information on some traits is unavailable for some species.

The text is sprinkled with numbered references to notes that appear at the end of each chapter. Many of these notes are great fun, solving mysteries large and small (What is the origin of reports that "walking palms" walk? What are the costs and benefits of open leaf sheaths? What is the cause and significance of swollen stems? Who are those 5-cm long stem-boring beetles that are such serious pests of cultivated palms? Why are species with elongate inflorescences more likely to be self-pollinated than those with condensed inflorescences?) Indeed, I often wished that their contents were incorporated into the text rather than relegated to a list on the final page or two of each chapter. Here, they may be easily ignored by an impatient reader unwilling to trace each numbered reference back to its corresponding note.

There are a few minor oversights and weaknesses to which readers should be alerted. For example, the interpretation of bivariate associations or correlations between traits is well-known to be difficult (or even misleading) if either trait is confounded with a third trait. Some of the interspecific correlations reported, while statistically significant, are associated with small sample sizes or represent congeners in a single genus; their generality remains to be confirmed. Henderson is appropriately cautious when describing such patterns; consequently, if these results are used as intended – to motivate the development of novel evolutionary hypotheses – the value of reporting them far exceeds the risk of overinterpretation. Given that Henderson's data are amenable to multivariate analyses, these should be pursued as they are more likely than bivariate analyses to shed light on the causal or mechanistic basis of correlations between traits. One minor mystery is that the line-drawings do not include scale bars. Finally, readers may wonder whether the data in the Appendix are available in electronic form for continued analysis; a note from the author concerning on-line availability of these data would have been most welcome.

In sum, this is the kind of book that should be written for every plant family (listening, New York Botanical Garden Press?) and then snapped up by any graduate student or seasoned researcher in search of either a comprehensive introduction or a review of the ecological and evolutionary diversity exhibited by his or her favorite or focal family.

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FIELD STATION PROFILE

Los Amigos Biological Stations, SE Peru

The Los Amigos field station is a five year-old facility in lowland Amazonian forest at the base of the Andes, contiguous to the largest block of tropical wilderness on Earth. With a campus of 13 permanent buildings, a capacity of up to 50 researchers, and a resident staff of 13, the station is a perfect base camp for research on undisturbed Amazonian landscape at large scales. In addition to 150 m^2 of laboratory space and a 100-km trail system, research facilities at Los Amigos include wireless satellite internet access, high-resolution digital aerial photos of >200,000 ha of surrounding forests, a digital bibliography of the >1,800 publications that have resulted from biological research in southeastern Peru, a field herbarium, library, public-use computers, color field guides to fish, amphibians and reptiles, plants, and dung beetles, and a smaller satellite station 25 km away. The station is managed by the Amazonian Conservation Association, a US-based NGO, and its Peruvian partner, the Asociación para la Conservación para la Cuenca Amazónica, which holds 40-year management rights to a 135,000-ha private conservation concession contiguous to the Los Amigos station.

Researchers at the Los Amigos field station, southeastern Peru, with a short-eared dog (*Atelocynus microtis*) radio-collared and ready for release.

Forests in this part of Amazonia hold world diversity records for birds, arboreal ants, terrestrial mammals, dung beetles, and dragonflies. They also support healthy populations of large terrestrial predators like jaguars, great herds of white-lipped peccaries, a variety of aquatic habitat with giant river otters, caimans, and several hundred fish species, and vegetation types ranging from wetland bogs to high sandy terraces. Special landscape features in this portion of Amazonia include clay licks visited by birds and mammals, actively meandering rivers and the associated mosaics of riparian-influenced wetland forest, huge patches of Guadua bamboo, dense stands of Brazil nut, natural rubber, and mahogany trees, and seasonal cold snaps that can drive the temperature below 5°C.

Lodging at the station ranges from do-it-yourself camping to private cabins; daily room and board is between $15 and $40. ACA's grants program subsidizes visits to Los Amigos by biologists at all levels (see grants announcement on page 3 in this issue of Tropinet). Each year the station hosts several large field biology courses with an emphasis on hands-on training opportunities for Latin American students. For additional details and contact info please visit http://www.amazonconservation.org/home/LosAmigos/cicra.htm

GETTING TO KNOW THE FRENCH AMAZON

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Review of Frans Bongers, Pierre Charles-Dominique, Pierre-Michel Forget, and Marc Théry, eds. 2001. *Nouragues: Dynamics and Plant-Animal Interactions in a Neotropical Rainforest.* Monographiae Biologicae, vol. 80. Kluwer Academic, Dordrecht, The Netherlands. ISBN 1-4020-0123-1. Hardcover, 421 pp. + xvi.

Although the study of tropical rainforests has matured enormously over the last decades, we continue to struggle to understand to what extent our observations apply beyond specific field sites or sets of environmental conditions to larger spatial scales or can be explained by generalizable factors. Inter-site comparisons suffer mostly from a shortage of well studied localities. Despite Amazonia's huge size, it's still tempting or necessary to generalize about particular aspects from a single study at a single site or even to assume that data from a non-Amazonian tropical site represent the Amazonian reality—as if only one such existed. *Nouragues* represents a welcome contribution from a corner of the region that has received relatively limited prior publicity.

Nouragues is a scientific field station located in the interior of French Guiana in undisturbed primary lowland forest. Most biologists would consider the area to pertain to the Amazonian biome, although strictly speaking it is outside the Amazon River basin. The station contains two distinct terrestrial habitats, true lowland forest mostly under 100m elevation and a granitic outcrop (inselberg) over 400m, each of which has its own base camp. Like many such research stations, Nouragues started with a fairly specific focus to meet the needs of a small group of researchers and has grown since its establishment in 1986 into a sophisticated site capable of supporting a large number of researchers (and even ecotourists) and providing infrastructure for a wide range of research foci on a longterm time scale. The original emphasis on the role of vertebrates in natural forest regeneration is reflected strongly in the contents of this volume, which stands in part as a synthesis of the first 10 or so years of research at this site.

Nouragues is divided in five major parts and a series of appendices. The Introduction contains three chapters, including a description and history of the field station as well as the geography and climate of the site, and a chapter on ambient light variation. This last is a welcome addition to the basic information normally provided and helps establish the necessary background for later chapters relating lekking bird and tree vegetative traits to available light. The remaining four parts deal with plant communities (Part II: 4 chapters), vertebrate communities and evolutionary ecology (Part III: 9 chapters), frugivory and seed dispersal (Part IV: 6 chapters), and forest dynamics and recruitment (Part V: 5 chapters). The section of appendices includes annotated species lists of plants, mammals, birds, herpetofauna, and fishes, as well as an identification guide to the palms present at the site. There are no chapters on invertebrates.

Several chapters are papers presenting original research on specific topics, such as different aspects of primate behavior, diet, and seed dispersal, marsupial habitat partitioning, kinkajous as seed dispersers, and understory vine seed dispersal by bats. Most chapters, however, are overviews compiled from the body of work previously published by their authors. As well as citing and synthesizing this literature and making substantive comparisons with other tropical sites, these chapters allow the authors the freedom to "go out on a limb" in a way that is rarely possible in journal articles. Reading what experienced scientists really think about the systems they've studied for years or decades, in text rich in stimulating insights, hypotheses, and well-informed opinions, is one of the real treats of this volume. Graduate students searching for research topics will eagerly snap up ideas, and experienced researchers from other regions will want to make contact and initiate collaborative studies based on the challenges to standard ideas presented in these chapters. Topics cover a generous range, including overviews of community structure in most plant and vertebrate groups, as well as the role of these taxa in seed dispersal and forest structure and disturbance dynamics.

The species lists will be of great interest to many researchers working at sites in other parts of Amazonia. Because in many cases they represent close to a decade or more of research, they are relatively complete. This makes their absences of expected taxa as interesting as what is listed, stimulating comparison among sites, questions to the authors, and hypotheses for future research. Readers inexperienced in the nomenclature of the species in their group of interest may have some difficulty with taxonomic

inconsistencies that reflect variability among available classifications and the current dynamism in systematics of the Neotropical biota, sometimes under active study by the authors themselves.

Although English is surely not the first language of most of the book's 43 contributing authors, the entire volume is published in English of an overall high quality, and the imperfections do not seriously compromise clarity. The book is published on good glossy paper and firmly bound in a compact format that encourages taking it with you, despite its hardcover. Unfortunately, it is slightly too large to photocopy two facing pages on a single sheet of paper without reduction, which of course is what many of its student readers will want to do. All literature cited throughout the chapters is compiled in a single references section at the end. Although this is an inconvenience for most readers and professors, who will be interested in filing or assigning specific chapters, the 32-page long reference section contains roughly 900 references, including, presumably, most of what's been published previously from the Nouragues site, making it a valuable "chapter" in its own right. All illustrations are in black and white, which is understandable but a bit of a disappointment, mostly because they include some high-quality photographs, which would probably be quite beautiful reproduced in color. Many of the chapters are preceded by a photo, apparently chosen at random. It is a little disconcerting to start reading a chapter on kinkajous while looking at a picture of tent bats, or one on primates faced by a photo of a boa, or on plant communities with a picture of a four-eyed opossum, but once you accept the capriciousness of it, the quality of the photographs themselves wins you over and leaves you wishing there were more of them.

Most tropical biologists will want to have *Nouragues* on their shelves next to comparable volumes from other Neotropical stations like La Selva, Barro Colorado Island, Cocha Cashu, and the Biological Dynamics of Forest Fragments reserves. The book gives the reader a solid feel for the site while at the same time treating a variety of topics in considerable detail, challenging ideas, and stimulating inter-site comparison. It will be a big success in graduate programs, where students will find considerable inspiration and professors will have a ready source of material for seminar discussions. Furthermore, the original research papers it contains make it a must for any library proposing to cover tropical ecological themes. I just took it with me on a multi-disciplinary field expedition in the Brazilian Amazon and could barely keep my hands on it, while it circulated among enthusiastic colleagues!

SPANISH-LANGUAGE CONSERVATION GIS COURSE

En el 2004, El Smithsonian's National Zoological Park's Conservation and Research Center en Front Royal, VA ofreció una beca para un curso de entrenamiento, en el idioma Español, sobre uso de SIG para Conservación. Como solo una cantidad limitada de becas estaban disponibles para satisfacer el gran número de solicitudes, varios de los solicitantes nos propusieron crear un nuevo curso de bajo costo en el idioma español. Basados en esta idea, estamos ofreciendo el nuevo curso introductorio de SIG para conservación:

USO DE SIG Y SENSORES REMOTOS EN BIOLOGÍA DE LA CONSERVACIÓN:

Introducción al uso de SIG y Sensores Remotos en la Conservación y Manejo de Vida Silvestre

22 de agosto-26 de agosto 2005

Para más detalles y registrarse visite la siguiente página electrónica:

http://nationalzoo.si.edu/ConservationAndScience/ConservationGIS/GIS%5Ftraining/intro%5Fspanish/

Contacto:

Vilmaliz Rodríguez Guzmán igespanol@si.edu
1500 Remount Road Front Royal, VA 22630
540-635-6535 (Lab SIG) 540-635-6506 (FAX)

**Nota: El CRC también está ofreciendo un Curso Avanzado en Uso de SIG y Sensores Remotos en Biología de la Conservación (en español), 29 de agosto-2 de septiembre, 2005. Los cursos enseñados en inglés a nivel introductorio y avanzado se ofrecen varias veces en el año en el CRC.

III CURSO EN MÉTODOS DE CAMPO EN ECOLOGÍA TROPICAL Y LA CONSERVACIÓN

ofrecido por El Centro Internacional para Ecología TropicalUniversidad de Missouri-St. Louis y el Zoológico de Saint Louis

DONDE? Centro Ecologico/Refugio de Vida Silvestre Los Guatuzos, dentro un mosaico de Bosque Seca, Bosque Humedo, Sabanas, Humedales, Rios, y Lagos, en el Sur de Nicaragua cerca la frontera de Costa Rica

CUANDO? 28 de Julio hasta 17 Agosto 2005

QUIEN? Acepteremos 15 participantes, escogido de Centroamerica y México principalmente. Este programa intensivo de tres semanas de campo, está diseñado para profesionales, al igual que estudiantes avanzados de biología, zoología, ecología, conservación, manejode recursos naturales y disciplinas afines.

COMO? El curso de tres semanas sera ofrecido gratis (curso incluye hospedaje, comidas, instruccíon, transporte local y equipo de instruccíon). No obstante los costos asociados con el viaje serán asumidos por cada uno de los participantes, igual dinero adicional como desean.

CON APOYO DE? fondos del Servicio de Pesca y Vida Silvestre de Los Estados Unidos, logisticas de Zoologico de Saint Louis, y Centro Ecologico Los Guatuzos

QUIERE MAS INFORMACION?

www.stlzoo.org/fieldcoursetropecology
http://icte.umsl.edu/courses.html Anota que no hay "www" al frente
Dr. John Polisar, Project Coordinator
Biodiversity of BOSAWAS Biosphere Reserve, Nicaragua
Email: polisar@stlzoo.org & cc: JJPolisar@aol.com
Telephone: 505-252-5993
Managua, Nicaragua

MEETINGS CALENDAR - 2005

SOCIETY FOR ECONOMIC BOTANY ANNUAL MEETING**,** 4 – 9 June, 2005, Fort Worth, Texas. The theme is "The Economics of Ethnobotany." For information, www.econbot.org.

V CONVENCION INTERNACIONAL SOBRE MEDIO AMBIENTE Y DESARROLLO
4 – 8 July 2005, Habana, Cuba, Palacio de Convfenciones de La Habana. Mas informacion: rearcem@prodigy.net.mx; gracia945@hotmail.com

SOCIETY FOR CONSERVATION BIOLOGY 19TH ANNUAL MEETING, 15-19 July, 2005. Hosted by the Universidade de Brasilia, in Distrito Federal, Brazil. The theme is "Conservation Biology Capacity Building and Practice in a Globalized World". See www.scb2005.unb.br

ASSOCIATION FOR TROPICAL BIOLOGY, ANNUAL MEETING**,** 24 – 28 July, 2005. Uberlandia, Minas Gerais, Brazil. The theme is "Frontiers in Tropical Biology and Conservation". See details at the web page at http://www.atbc2005.ufu.br/atbcmain.htm

XVII INTERNATIONAL BOTANICAL CONGRESS, Vienna, Austria Center, 17-23 July 2005. http://www.ibc2005.ac.at

XXIInd IUFRO WORLD CONGRESS, 8 – 13 August, 2005. The International Union of Forest Research Organizations will meet in Brisbane, Australia, under the theme "**Forests in the Balance: Linking Tradition and Technology"** More information is available at the congress website: http://www.iufro2005.com

TALLER DE CONSERVACIÓN DEL TAPIR CENTROAMERICANO**:** Evaluación de Viabilidad Poblacional y de Hábitat (PHVA) 1 Agosto 2005. The Belize Zoo y The Tropical Education Center, Belice. Contact: Patricia Medici, epmedici@uol.com.br or medici@ipe.org.br

SOCIETY FOR ECOLOGICAL RESTORATION, 2005 International Conference, 12-18 August, 2005, in Zaragoza, Spain. Information is available at http://www.ser.org/content/2005Conference.asp

BOTANY 2005, BOTANICAL SOCIETY OF AMERICA ANNUAL MEETING, 13-17 August, 2005. The theme is "Learning from Plants." The meeting will be at the Austin Hilton Hotel, in Austin, Texas. For information, see: http:/www.2005.botanyconference.org/ScientificMeeting/index.php

VII CONGRESO LATINOAMERICANO DE HERPETOLOGIA, 15 – 19 Agosto, 2005, Cuernavaca, Morelos, Mexico. Inf: faustor@ibiologia.unam.mx or at castro@cib.uaem.mx

IV INTERNATIONAL CONGRESS OF ETHNOBOTANY (ICEB 2005), 21-26 August, Yeditepe, Istanbul, Turkey. The theme is "Ethnobotany: at the junction of the continents and the disciplines. For registration information, go to: http://www.iceb2005.com/index.html

8TH WORLD WILDERNESS CONGRESS**,** 30 September - 6 October 2005, in Anchorage, Alaska. The theme of the meeting will be "Wilderness, Wildlands and People - A Partnership for the Planet. Registration at : http://www.8wwc.org/

PRIMER CONGRESO COLOMBIANO DE PRIMATOLOGÍA**,** 2 al 4 de noviembre de 2005, Bogotá, Colombia. Mayor informacion: http://www.geocities.com/primatescolombia/Congreso.htm

1ST DIVERSITAS INTERNATIONAL CONFERENCE ON BIODIVERSITY**,** 9-12 November, Oaxaca, Mexico. The meeting, at the Hotel de Mision de Los Angeles, will take the theme "Integrating Biodiversity Science for Human Well-Being." The web site is at: http://www.diversitas-osc1.org/

II INTERNATIONAL CONGRESS OF DRY FORESTS AND V ECUADORIAN BOTANICAL CONGRESS, 14-17 November, 2005, in Lojas, Ecuador. See: http://www.funbotanica.org/

Tropinet

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