

- Los párpados pueden ser abiertos y cerrados sin dificultad con la mano.
- Las orejas grandes presentan una coloración más oscura y están dispuestas en la nuca como en individuos adultos, unidas en la base.
- Se encuentran completamente formados y son verdaderas réplicas de los adultos.

NEWS

Biology and Maintenance of Armadillos (*Dasypodidae*)

A doctoral thesis which reviewed the biology, maintenance and current status of armadillos kept in captivity was defended by Mariella Superina in June 2000 at the Institut Für Zoo-, Heim- und Wildtiere, University of Zürich, Switzerland. Her research advisor was Prof. Dr. Ewald Isenbügel, with codirector Prof. Dr. Rico Thun. Her research was supported in part by a Reisestipendium (a grant for scientific studies in a foreign country) from the Schweizer Akademie für Naturwissenschaften in Zürich, Switzerland in October 1999. It permitted a one-month stay at the Universidad Nacional del Sur in Bahía Blanca, Argentina, which enabled her to participate in field studies and learn the handling of armadillos.

The introduction is based on the literature, conversations with scientists and personal observations. It discusses the evolution, taxonomy and biology of the 21 known species of armadillos, as well as different aspects of their care and maintenance in captivity, and contains information on adequate and appropriate housing, nutrition and their reproduction. Comments on their handling and on suitable blood-sampling techniques, hematological parameters and a compilation of the most common diseases and their therapies should help zoo veterinarians in the husbandry and management of armadillos.

This first section is followed by the results of a survey made in European and North, Central, and South American zoological gardens that keep armadillos. The zoos were asked for information about housing, nutrition, reproduction and ethology as well as the diagnosed pathologies and causes of death of their armadillos. The analysis of this survey demonstrated that there are serious problems in the care and maintenance of armadillos, which affect their reproduction and health and create stereotypic behavior, such as pacing or constant digging. Because of poor data, we were unable to pinpoint the factors responsible for the lack of reproductive success and the onset of stereotypic behavior, although possible reasons for the appearance of this behavior in 50% of the zoos surveyed are discussed. Some recommendations are made for behavioral enrichment, improvement of enclosures, better nutrition and ideas for presentation to the visitor, in order to increase the attractiveness of armadillo exhibits. A comparison of the conditions in which armadillos are usually kept in zoos on different continents with Swiss legislation and the guidelines of the Swiss Society for the Protection of Animals clearly shows that it is unacceptable to keep armadillos in current conditions. The animals are held in exhibits that are too small and have little enrichment, are fed inappropriately and suffer from pathologies related to poor maintenance in captivity. Of the zoos surveyed, only a few have breeding programs, and they are rarely successful. Keeping armadillos in captivity is only justifiable if efforts are made to improve their living conditions and to meet the dietary needs of each species. Field studies and further research on captive armadillos are recommended in order to reach this goal.

Dr. Superina is currently working on the translation of her doctoral thesis into English, which she plans to have completed and published soon.

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Superina, M. 2000. Biologie und Haltung von Gürteltieren (Dasypodidae). Doctoral thesis, Institut Für Zoo-, Heim- und Wildtiere, Universität Zürich, Zürich, Switzerland. 250pp.

Giant Anteater (*Myrmecophaga tridactyla*) Beehive Foraging at Emas National Park, Brazil

The largest species of anteater in the world, *Myrmecophaga tridactyla*, is widely dispersed throughout Central and South America, living in varied habitats, including forests and open grassland. The Emas National Park (ENP), about 133,000 ha and mostly savanna, is one of the most important reserves of the Cerrado, and is located in the southwest of the state of Goiás, bordering the states of Mato Grosso and Mato Grosso do Sul.

In the late afternoon of 1 February, 2003, we were following two giant anteaters to capture one of them to attach a radio-transmitter (the other was already equipped) in a grassland area of the ENP. Following the capture and near the capture site, we observed and photographed marks produced by an anteater's claws, alongside a nearly circular burrow (20 cm diameter) in a termite mound about 1.5 m high. Inside this burrow, were found bees, honey, beehive wall, and the remains of a recently destroyed small *Apis mellifera* colony.

We found a bee in the fur of the captured anteater and a small swarm hovered around it, suggesting that this animal may have attacked the beehive to eat the insects and/or the honey or other items. Anteaters have rarely been recorded attacking bees' nests (Cabrera and Yepes, 1940). Bee products are rich in nutrients and the association of a beehive with the termite mound, commonly foraged by anteaters, could facilitate the encounter, resulting in the consumption of bees and their products. In spite of similar problems associated with ants and termites (low nutritional value of the prey, small prey size and forms of defense relying on the sociality of the prey) (Redford and Dorea, 1984), bees

may be a suitable food source for giant anteaters (Redford, 1986).

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Official List of Brazilian Fauna Threatened with Extinction – 2002

A workshop, involving about 200 Brazilian and international specialists, was held from 9-12 December, 2002, in Belo Horizonte, Minas Gerais, to revise the Official List of Brazilian Fauna Threatened with Extinction (*Lista Oficial da Fauna Brasileira Ameaçada de Extinção*). The previous revision was in 1989 (Edict 1.522, 19th December, 1989; Bernardes *et al.*, 1990). The workshop was coordinated by the Fundação Biodiversitas, in collaboration with the local NGO Terra Brasilis, Conservation International do Brasil (CI do Brasil), and the Sociedade Brasileira de Zoologia (SBZ), and was held at the specific request of the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) of the Ministry of the Environment (MMA). Sponsorship was provided by the Programa de Biodiversidade (PROBIO) of the Ministry of the Environment (MMA), Shell do Brasil, Grupo Odebrecht, and Conservation International do Brasil. It was also supported by the US Fish and Wildlife Service and Avina.

Demonstrating the importance given to this workshop as a major evaluation of the status of the nation's fauna by the scientific community, the opening ceremony was attended by the Minister of the Environment of Brazil, José Carlos Carvalho; the Minas Gerais State Secretary for the Environment, Celso Castilho; the President of Biodiversitas, Roberto Messias Franco; the President of IBAMA, Rômulo José Fernandes Barreto Melo; the President of SBZ, Olaf Mielke; the Director President of CI do Brasil, Roberto Brandão Cavalcanti; and the Director of Terra Brasilis, Sônia Rigueira.

The list of threatened species tripled from 218 in the 1989 revision to 630, with two extinct in the wild (still maintained in captivity) and a further 10 extinct. The increase in numbers was due to the inclusion of new groups (fish and many invertebrate groups) which had not been assessed previously (only some insects, including

Odonata, and Onycophora and Cnidaria were assessed in 1989), but also to an increase in our knowledge of the status of the country's fauna. Eight edentates were assessed, and four were listed as threatened, of which two are endemic to Brazil (*Bradypus torquatus* and *Tolypeutes tricinctus*). The criteria used to evaluate threatened status were those of the IUCN – World Conservation Union Species Survival Commission (SSC), Version 3.1 (IUCN, 2001), with adaptations to a regional scale as proposed by Gärdenfors *et al.* (2001) and approved by the SSC.

Adriano Chiarello (Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte) was the coordinator for the Mammal Group. Gustavo A. B. da Fonseca (Center for Applied Biodiversity Science at Conservation International and Universidade Federal de Minas Gerais, Belo Horizonte) and Adriano Chiarello were joint coordinators of the Edentate Sub-group. Prior to the workshop, information and the opinions of numerous mammalogists and conservationists were solicited through a site on the internet specifically set up for the purpose by the Fundação Biodiversitas. To give an idea of the extent to which the scientific and conservation community were consulted, we give here some statistics. Fifty-two people replied to the consultation for Brazilian mammals, providing a total of 392 “contributions” in terms of pertinent information on a particular species (Table 1). Dividing them into six groups, it can be seen that the Primates and Carnivora attracted the most attention, with 103 contributions from 15 people for

TABLE 1. The number of people who provided information for the assessment of the threatened status of Brazilian mammals in the pre-workshop consultation, and the number of contributions regarding a particular species.

Sub-group	Informants	Contributions
Primates	15	103
Carnivora	21	93
Chiroptera	6	33
Aquatic mammals	8	42
Small mammals	13	42
Other mammals	22	79

the former, and 93 contributions from 21 people for the latter. Fifteen people provided useful input (37 contributions) regarding the status of the Brazilian edentates.

Threatened Edentates

Following the criteria and categories of IUCN (2001), the assessments for eight species of Brazilian edentates resulted in the listing of four as threatened and four as “Data Deficient” (Table 2). The threatened species were ranked as “Vulnerable”. Two of them have a wide geographic distribution, the giant armadillo (*Priodontes maximus*) and the giant anteater (*Myrmecophaga tridactyla*). Although widely distributed, these species seem to be rare everywhere, a fact related

to their large body size and specialized diet (social insects). The other two threatened edentates have much smaller ranges: the northern three-banded armadillo, or tatu bola (*Tolypeutes tricinctus*), which is restricted to the Caatinga (a xerophytic desert scrub and deciduous forest) of northeastern Brazil and adjacent parts of the Cerrado; and the maned sloth (*Bradypus torquatus*), which occurs in the Atlantic forest in the states of Bahia, Espírito Santo and Rio de Janeiro.

Ascertaining the conservation status of most Brazilian edentates was a rather difficult task given the overwhelming lack of basic population and ecological data for most species, even for the largest and most conspicuous. This limitation is

TABLE 2. Edentates on the Official List of Brazilian Fauna Threatened with Extinction, their category and the criteria of threat (following IUCN, 2001), and their distributions in terms of countries, states, and biome. Workshop: Revisão da Lista Oficial da Fauna Brasileira Ameaçada de Extinção, December 2002.

Species and subspecies	Common name	Distribution	States	Biome				Criteria (IUCN, 2001)
				MA	AM	CE	CA	
Vulnerable (VU)								
<i>Bradypus torquatus</i>	Maned sloth	Brazil	SE, BA, ES, MG, RJ	x				A2cd
<i>Myrmecophaga tridactyla</i>	Giant ant-eater	South and Central America	AC, AM, BA, DF, GO, MG, MT, PI, RO, RS, SC, AP, MA, MS, PA, PR, RR, SP, TO	x	x	x	x	A2cd
<i>Tolypeutes tricinctus</i>	Three-banded armadillo	Brazil	BA, GO, PI, AL, RN			x	x	A2cd
<i>Priodontes maximus</i>	Giant armadillo	South America	AC, AM, BA, DF, GO, MG, MT, PI, RO, AP, ES, MS, PA, RR, TO	x	x			A2cd
Data Deficient (DD)								
<i>Tolypeutes matacus</i>	Southern three-banded armadillo	Bolivia, Paraguay, Argentina, Brazil	MT			x		Data Deficient
<i>Cabassous tatouay</i>	Greater naked-tailed armadillo	Brazil, Uruguay, Paraguay, Argentina	PI, PA, MT, MS, GO, ES, RJ, PR, SP	x		x		Data Deficient
<i>Cabassous chacoensis</i>	Chacoan naked-tailed armadillo	Brazil, Bolivia, Paraguay, Argentina	MT, MS			x		Data Deficient
<i>Dasybus hybridus</i>	Southern lesser long-nosed armadillo	Brazil, Paraguay, Argentina	RS	x				Data Deficient

States: AC = Acre, AL = Alagoas, AM = Amazonas, AP = Amapá, BA = Bahia, DF = Federal District, ES = Espírito Santo, GO = Goiás, MA = Maranhão, MG = Minas Gerais, MS = Mato Grosso do Sul, MT = Mato Grosso, PA = Pará, PI = Piauí, PR = Paraná, RJ = Rio de Janeiro, RN = Rio Grande do Norte, RO = Rondônia, RR = Roraima, RS = Rio Grande do Sul, SC = Santa Catarina, SE = Sergipe, SP = São Paulo, TO = Tocantins. **Biomes:** MA = Mata Atlântica, AM = Amazônia, CE = Cerrado, CA = Caatinga.

most severe for armadillos, which are notoriously difficult to observe and study in the wild. Almost nothing, for example, is known of the naked-tailed species of the genus *Cabassous*. Two species of this genus were listed as data deficient (*C. tatouay* and *C. chacoensis*) as a result. In general terms the most prominent threat to xenarthrans in Brazil is habitat destruction or alteration. This is happening not only in the Atlantic forest, where the giant armadillo and the giant anteater are on the verge of regional extinction, but also in the Cerrado and Caatinga. Enormous tracts of Cerrado in the states of Goiás, Mato Grosso and Tocantins, for example, are being cleared at accelerating speeds to make room for pasture and soy bean plantations. This vast region is the major agricultural frontier in Brazil, attracting farmers from other states, notably from southern Brazil, that take advantage of the relatively low land prices. Other main threats include illegal hunting, widespread in Brazil, and fire, notably in the Cerrado region, which particularly affects the giant anteater.

The following people contributed to the pre-workshop consultation for edentates: José de Sousa e Silva Jr., Tadeu de Oliveira, Teresa Cristina Anacleto, Carlos Eduardo Grelle, Fernando Passos, Vera Lúcia Oliveira, Sérgio Maia Vaz, Laurenz Pinder, Rogério C. Paula, Cristiane Encarnação, Antônio R. Mendes Pontes, Denis Sana, Maria Auxiliadora Drumond, Sônia Talamoni, and Flávio Rodrigues.

Prof. Ângelo B. M. Machado, world expert on Neotropical dragonflies, and Professor of Zoology at the Federal University of Minas Gerais, led the assessment process in 1989 (Bernardes *et al.*, 1990), representing the Sociedade Brasileira de Zoologia (SBZ). He was again the driving force for the 2002 re-assessment of the Official List of Brazilian Fauna Threatened with Extinction. This time, representing the Fundação Biodiversitas, he was general coordinator for the workshop and the assessment, and most competently supported by the staff, who are uniquely experienced in carrying out these sorts of workshops (see, for example, Fonseca *et al.*, 1994; Lins *et al.*, 1997; Machado *et al.*, 1998; Mendonça and Lins,

2000), and deserve special acknowledgment: Gláucia Moreira, Cassio Soares Martins, Cláudia Costa, Lívia Vanucci Lins and Gisela Herrmann. Considerable support was also provided by Mônica Fonseca and Adriano Paglia of Conservation International do Brasil, Belo Horizonte.

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Mendonça, M. P. and Lins, L. V. 2000. *Lista Vermelha das Espécies de Extinção da Flora de Minas Gerais*. Fundação Biodiversitas, Fundação Zoo-Botânica de Belo Horizonte, Belo Horizonte.

Online Bibliography on Armadillos

Dr. Mariella Superina, Med. Vet. has compiled an extensive bibliography on armadillos, which contains approximately 2700 titles. References cited are grouped by years: to 1900, 1901-1950, 1951-1960, 1961-1970, 1971-1980, 1981-1990, 1991-2000, and undated. Each reference grouping is available to download as a single large PDF file, typically with 20-30 pages of references for each of the later decades. The bibliography may be found online at: <http://www.vetmed.lsu.edu/pbs/armadillo_bibliography.htm> and is updated regularly. Dr. Superina would greatly appreciate any comments, error reports, and notes regarding missing entries, as well as citations for any new publications. For further information contact: Dr. Mariella Superina, University of New Orleans, Department of Biological Sciences, New Orleans, LA 70148-0001, Tel: (504) 280-6737 or e-mail: <mariella@superina.ch> or <mesuperi@uno.edu>.

Kaa-Iya Project, Gran Chaco, Bolivia

The Kaa-Iya Project is a collaboration between the Wildlife Conservation Society (WCS) and the Capitanía del Alto y Bajo Izozog (CABI – the political representation of the Izoceño-Guaraní Indians), with support from the United States Agency for International Development (USAID). In order to conserve biodiversity in the Kaa-Iya National Park (3.4 million ha) and the neighboring Izoceño indigenous territory (1.9 million ha)

through community wildlife management, the project began a self-monitoring program with Izoceño hunters in 1996. Several hundred hunters participated from 20 communities. Armadillos are hunted a little less than ungulates, with five species representing 4000 captures (in order of importance): *Dasypus novemcinctus*, *Tolypeutes matacus*, *Chaetophractus villosus*, *Euphractus sexcinctus* and *C. vellerosus*. The first two species alone comprised three-quarters of the captures. Subsistence hunting (armadillos are not hunted for commercial means) in the Izoceño indigenous territory appears to be sustainable except possibly in the case of *T. matacus*. A management measure proposed in community meetings, but not yet implemented, is to restrict hunting of female armadillos during the reproductive season (September-December for all species, the austral springtime with the end of the dry season and beginning of the rainy season).

A sixth sympatric species in the Izozog of Chacoan thorn scrub and grasslands is *Chlamyphorus retusus*, which the Izoceños consider to be an evil omen (see *Edentata* (4): 14-16, 2001). The eastern and northern regions of the Kaa-Iya National Park are also home to *Priodontes maximus* in Chiquitano transitional dry forest, recorded in camera traps along the Bolivia-Brazil gas pipeline. Finally, we have registered *Cabassous unicinctus* in Chiquitano transitional dry forest just north of the Bolivia-Brazil gas pipeline and the Kaa-Iya National Park. This record comprises the southernmost location for the species' known distribution in Bolivia, and a significant range extension.

Two other edentates, *Tamandua tetradactyla* and *Myrmecophaga tridactyla*, are present in both Chacoan and Chiquitano transitional dry forests. Izoceños occasionally consume *M. tridactyla* meat, and the species is a preferred prey item for Ayoreo Indians, whereas *T. tetradactyla* is killed only accidentally and infrequently by dogs.

Hunting records have provided useful information on activity patterns and habitat use for the five species which are important prey items. In

addition, Izoceño hunters have provided specimens from hunted animals with which we have analyzed diet for all five species, as well as reproduction in *Dasybus novemcinctus*. The diversity of animals making and using burrows in the Chaco has impeded accurate censuses from burrow counts, while line transect censuses are not practical for the species or the habitat; but efforts to census armadillos with hunting dogs offer some promise. Spool-and-thread as well as implanted radio-transmitters are proving effective in tracking *T. matacus*. The WCS Field Veterinary Program and the Lincoln Park Zoo are collecting serology and parasitology data on *D. novemcinctus* and *T. matacus*.

For additional information please contact **Erika Cuéllar** or **Andrew Noss**, Proyecto Kaa-Iya, Casilla 6272, Santa Cruz, Bolivia, e-mail: <anoss@infonet.com.bo>.

Online Bibliography on Sloths

“Sloth World” is an online bibliography and database compiled by Virginia L. Naples and Robert K. McAfee. The site is updated regularly and can be searched by Author, Recent Publications (1991-2002), Specific Genus (classification follows Bell and McKenna) including extinct genera, and Museum Collections. “Sloth World” also includes sections entitled, “What is a sloth?” and “Slothologists”, which gives the names and addresses of researchers who study extinct and extant sloth anatomy, systematics, evolution, ecology, and behavior. “Sloth World” may be found at: <<http://www.sloth-world.org>>.

PAX TAG Meeting

The inaugural meeting of the newly approved American Zoological Association Pangolin, Armadillo and Xenarthran Taxonomic Advisory Group (PAX TAG) took place in Tucson, Arizona, as

part of the AZA Western Regional Conference, on 26 April, 2002. The conference was co-hosted by the Reid Park Zoo and the Arizona-Sonora Desert Museum, and was held at the DoubleTree Hotel at Reid Park.

The meeting agenda included: Steering Committee elections; completion of a space analysis survey (present / projected 3-year / projected 10-year); report of existing holdings by species (per ISIS); development of a regional collection plan, including establishing criteria for captive priorities, issuing management recommendations for Studbooks, Population Management Plans, and Species Survival Plans, non-target species and accession/de-accession policies; development of a three-year action plan, including fund raising initiatives and *in situ* projects; and review status of AZA mammalian standards updates.

Presentations were given by Don Gillespie, DVM, Nashville Zoo, on giant anteater husbandry; John Gramieri, Lincoln Park Zoo, on a FOIA data analysis of pangolin, armadillo, and xenarthran imports; and Jennifer Pervola, Deputy Chair of the IUCN/SSC Edentate Specialist Group, on activities of the ESG.

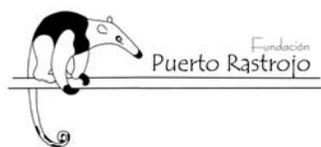
Mike Flint is currently arranging to have elections and other infrastructure for PAX TAG in place by the end of March 2004. For more information, he may be contacted at 520-548-2206 or <mrzoo@cox.net>.

PAX Listserve

PAXtalk is a newly established listserv established to promote communication relative to the husbandry and management of pangolins, armadillos and xenarthrans. John Gramieri of the Lincoln Park Zoo is the moderator of the discussion list, <paxtalk@lists.aza.org>. To sign up for the list and to find out more about the listserv, how it works, how to use it, and which groups you are subscribed to, go to <<http://www.paxtalk.org>>.

//xlists.aza.org> (click on MEMBERS). Due to concerns about computer viruses, please refrain from attaching files to the messages you post. The contents of your existing files can usually be posted by choosing EDIT > SELECT ALL > COPY and then PASTE into your messages. PAXtalk is an open listserve, which will serve well to expedite the gathering of valuable information about pangolins, armadillos and xenarthrans. Anyone can post requests for information and ideas about these unique mammals. You may unsubscribe at any time by e-mailing John Gramieri at: <jgramieri@lpzoo.org>.

Atlas of the Colombian Amazon



Fundación Puerto Rastrojo is pleased to present the CD-ROM “Atlas of

the Colombian Amazon”. A consultative tool, the Atlas contains information about different aspects of the Colombian Amazon, including the physical environment, public services, colonization processes, economy, indigenous settlements, National Parks and institutional presence (amongst others). The Atlas contains more than 35 interactive maps, as well as a database with 47,000 species localities and a collection of 112 photos illustrating the variety of landscapes, ways of life and activities of the Colombian Amazon. We hope that this multimedia application will be useful for researchers, students, public and private institutions and the general public. The use of the maps, photos, data and texts included in the CD-ROM is free of restriction, as long as reference is made to the source. Fundación Puerto Rastrojo is a Colombian NGO which has spent the last 20 years working in the Colombian Amazon carrying out conservation, research and training programmes.

The Atlas is available in Spanish. For more information please contact Fundación Puerto Rastrojo (FPR), Cra. 10 No. 24-76, Of. 1201,

Bogotá, Colombia, Tel: (57 1) 284-9010, 560-7054, Fax: (57 1) 560-7055, e-mail: <rastrojo@uolpremium.net.co>.

European Zoos' Commitment to Conservation of the Atlantic Rainforest – EAZA Rainforest Campaign

The mission of the European Association of Zoos and Aquaria (EAZA), Chairman Miklós Persányi, Director Koen Brouwer, is to promote co-operation for furthering wildlife conservation, particularly through internationally-coordinated breeding programmes of wild animals, through the European Endangered Species Programmes (EEP); to promote education, in particular environmental education; to promote regional collection planning activities; to contribute to relevant meetings and discussions of the supra-international organizations, such as the United Nations, The World Conservation Union – IUCN, the European Union, and the Convention on International Trade in Endangered Plant and Animal Species (CITES); and to advise, as required, the European Union, or other representative committees such as the European Parliament and the European Council.

At their annual conference in Prague in September 2001, the EAZA launched a major, two-year, fund-raising campaign in support of the conservation of the threatened fauna and flora of the endangered Atlantic forest of Brazil, eastern Paraguay and northern Argentina (2001-2002). The Atlantic rain forest was chosen because of its status as a priority area for the World Association of Zoos and Aquaria (WAZA), and focuses particularly on the conservation programs for the four lion tamarin species, *Leontopithecus*. The zoo community worldwide has played a fundamental role in the overall conservation programs for these species in terms of reintroduction, translocation, meta-population management, scientifically-managed captive-breeding, and their participation in the international lion tamarin committees

and support for conservation efforts in the field (see Mallinson, 1996; Kleiman and Mallinson, 1998; Kleiman and Rylands, 2002). Most zoos keeping one or more of the species also use them as flagships for their conservation efforts. The goals of the campaign are to raise awareness about the conservation needs and conservation programmes in the Atlantic rain forest, and to raise money for the Lion Tamarins of Brazil Fund – established in 1991 by the founder of the Jersey Zoo, Gerald Durrell, as a mechanism specifically targeting the institutions holding lion tamarins in captivity to mobilize financial support for ongoing field conservation and research efforts and to launch critical new initiatives (Mallinson, 1994).

The Campaign Planning Group includes: David Field (Dublin Zoo, Ireland), Bengt Holst (Copenhagen Zoo, Denmark), Kristin Leus (Antwerp Zoo, Belgium), Jeremy J. C. Mallinson (until recently of the Durrell Wildlife Conservation Trust, Jersey) and, as Liaison for the EAZA Executive Office, Corinne Bos (Amsterdam Zoo, The Netherlands). It is hoped that the EAZA Rainforest Campaign will have a long-lasting effect through a better understanding of the existing conservation programmes and a more direct involvement of the European zoo world. The campaign will thus contribute to the fulfillment of the accepted obligation of zoos “to contribute to animal conservation”.

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Captive Breeding of Giant Anteaters at the Houston Zoo

Breeding Behavior

In our pair of giant anteaters, the female is the one who initiates breeding. She follows the male very closely and won't let him out of her sight. She then grabs hold of him by standing up on her back legs and placing her front legs on his back, forcing him to the ground. (This is easily done because she is 20 lbs heavier.) Initially, it looks as if she is trying to get up on his back like a baby anteater. Many times the male tries to get away from her, but is unable to, and this may go on for several minutes until he relents. We have observed both animals in a “face-to-face embrace” for up to 30 minutes. This will occur off and on for the entire day. Although they are separated in the evening, we have seen the behavior continue again the next day.

Neonates

Our female has had several offspring here at the Houston Zoo, and initially we tried to let her raise them herself. After she demonstrated repeatedly that she was unable to successfully raise her offspring, we decided to attempt to hand-raise the infants. We have now successfully hand-raised two juveniles.

Prior to parturition, we keep her inside so that if she does deliver during the night, she will be



FIGURE 1. This baby giant anteater was born on August 21st, 2002 and weighed in at 1907 grams.

away from the other animals in the enclosure, including the male. After the infant is born, we continue to keep her inside the barn so that she can bond with the infant. Initially she is gentle and seems very attentive; but at anywhere from 3 to 5 days after birth she becomes very aggressive, with fatal consequences for the infant. Until we can determine the variables that will improve her maternal behavior, we will continue to hand-rear all future offspring.

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Pepita y Rafaelo Fueron Padres

El día 4 de junio del 2002 nació un ejemplar de oso hormiguero mayor (*Myrmecophaga tridactyla*) en el Zoológico de Zürich, Suiza. Este ejemplar es hijo de Rafaelo y Pepita. Lo auspicioso de este nacimiento es que Pepita llegó al zoo hace apenas 9 meses. Rafaelo vive aquí desde abril de 1996. Pero a pesar de haber compartido su recinto durante 5 años con “Yurumi” una hembra de la especie, nunca se había reproducido.

Pepita provenía de la naturaleza y fue entregada por las autoridades de Fauna de la Provincia de Santa Fe, República Argentina a la Fundación



FIGURA 1. El día 4 de junio del 2002 nació un ejemplar de oso hormiguero mayor (*Myrmecophaga tridactyla*) en el Zoológico de Zürich, Suiza

Wildermuth, en Colonia Belgrano de la misma provincia siendo un bebé, para su crianza.

El cuidado de la misma estuvo a cargo del Sr. Heinz Oppliger y la Sra. Gabriela Krauer. La llegada al zoo de Zürich se produjo a fines del mes de agosto del 2001 y fue “presentada” a Rafaelo el 14 de noviembre del mismo año, luego del período de cuarentena. De lo que se deduce que quedó preñada de forma inmediata, ya que la gestación dura 190 días.

Guillermo Pérez Jimeno, Agrelo 1835, (2005) Rosario, Argentina. E-mail: <tamandua@arnet.com.ar>.

Giant Anteater Sighting

Paule Gros, a scientist at the St. Louis Zoo who heads the Zoo’s conservation project in the Bosawas Biosphere Reserve in northern Nicaragua, has reported a sighting of the endangered giant anteater (*Myrmecophaga tridactyla*) there. The discovery is significant due to decreasing populations in Central America. The Reserve lies just south of the Nicaragua-Honduras border and has been dubbed “Central America’s Amazon” because it is part of the largest rain forest north of the Amazon. Working with the Zoo and also the International Center for Tropical Ecology at the University of Missouri at St. Louis, Gros is leading a biological inventory of the region, and training Mayangnan forest guards. Since the project began in January 2000, researchers working in the reserve have also found evidence of the silky anteater (*Cyclopes didactylus*) and the northern tamandua (*Tamandua mexicana*).

Update on Nine-Banded Armadillo Research in the U.S.

We have been studying the nine-banded armadillo (*Dasypus novemcinctus*) population at Tall Timbers Research Station in northern Florida

since 1992. Unfortunately, that study is now at an end for two reasons. First, an extensive hardwood removal program conducted between 1998-2000 has led to significant habitat alterations, which in turn have reduced the armadillo population at our study site by over 50%. Second, Tall Timbers has contracted with the U.S. Department of Agriculture on a study to examine the impact of removing nest predators of bobwhite quail eggs. As armadillos are one of these predators, the few remaining animals in our study area will be removed (i.e., killed) beginning in the spring of 2004. Consequently, we are in the process of considering new directions for our research. At present, we see the following as the most promising avenues for future work:

- 1) *Population Genetics*: We have collected DNA samples from nine-banded armadillo populations located in areas across the species' range (e.g., Brazil, French Guiana, Mexico, and many parts of the U.S.) in order to describe phylogeographic patterns in the genetic structure of these populations. However, additional samples from other parts of the species' range would make our analyses far more robust.
- 2) *Chemical Ecology*: For animals whose primary sense seems to be olfaction, surprisingly little work has been done on the chemical signals produced by armadillos. In nine-banded armadillos, secretions from the paired anal glands seem a likely source of odors used in chemical communication. It would be interesting to examine what types of information might be available in these secretions (e.g., identity, state of sexual receptivity, etc.). In particular, as *D. novemcinctus* produces litters of genetically identical quadruplets, it would be exciting to determine whether the composition of odors somehow covaries with genetic relatedness.
- 3) *Disease Ecology*: Nine-banded armadillos are one of the few animal models for leprosy, yet almost nothing is known about the impact of the disease in wild populations. Our population at Tall Timbers was leprosy-free, so we now have an extensive database on an uninfected population. It might be worthwhile to now

find a population where leprosy is prevalent and repeat the work we did at Tall Timbers in order to assess how the disease affects armadillo population structure and behavior.

- 4) *Comparative Analyses*: One of the main reasons for our study of nine-banded armadillos was to assess the impact of polyembryony on population structure and behavior, particularly with regard to the potential for kin selection. We have found little evidence of any kin selection occurring in *D. novemcinctus*, but that does not preclude its possible importance in other members of the genus. What is required are comparative data from the other species in the genus *Dasybus*. (In fact, as a first step, we need genetic data from these other species confirming that littermates are indeed polyembryonic.) At an even broader level, we still have very limited knowledge of basic life-history characteristics for many armadillo species. For example, even published data on something as basic as litter size are often based on very limited observations or rely on information from captive births, which may not be representative of what occurs in the wild. Such data are critical if we are ever to understand evolutionary patterns within this enigmatic group.

Any comments, suggestions, or ideas regarding the above would be most welcome, as would any proposals for collaborative projects. We can be reached via e-mail at either <jloughry@valdosta.edu> or <cmcdonou@valdosta.edu>.

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Armadillo Online!

Maintained by Joshua P. Nixon, "Armadillo Online" is an extensive site dedicated to the 20 species of armadillo, including pictures of eight. The site gives brief biological summaries of each armadillo species, including: range, description, habitat, ecology, and biology; a short article sum-

marizing the natural history of the armadillo; a quick fact file which answers commonly asked questions about armadillos; and a short description of the scientific and medical research uses of armadillos. Also listed is a page discussing common problems caused by armadillos, such as yard destruction. The site can be viewed at: <<http://www.msu.edu/~nixonjos/armadillo/>>. For questions or comments contact Joshua Nixon, e-mail: <nixonjos@msu.edu>.

WildlifeDecisionSupport.com

WildlifeDecisionSupport.com was launched by Dr. Andrew McKenzie, the editor of the *Capture and Care Manual* – which has become the definitive text for wildlife managers, ranchers and veterinarians – and Peter Morrison, a well-known ecotourism manager.

The first edition of the *Capture and Care Manual* is virtually sold out and at this stage there is no definite plan for a second edition; however, the full text of the *Manual* is now online at <<http://wildlifedecisionsupport.com>>. The site also has a community-based section where members can share their experiences, knowledge, techniques and queries with colleagues and experts globally. A “news and smalls” section keeps the members up-to-date with their industry and the option to market or purchase services or products. The site also distributes the specialized wildlife publications of the Wildlife Group and has recently become the South African distributor for the World Organization for Animal Health. For further information contact: Peter Morrison, Member Communications at <<http://wildlifedecisionsupport.com>>.

Edentate Conservation Action Fund – Grants Awarded

Financed by Conservation International’s Center for Applied Biodiversity Science, the Edentate Conservation Action Fund offers small grants to

individuals doing conservation research on edentates. In 2002 the Fund approved the following three research projects:

Hematology, Parasite Load and Health Status of Wild *Zaedyus pichiy* Populations in Mendoza, Argentina – Mariella Superina. The pichi (*Zaedyus pichiy*), an armadillo endemic to Argentina and Chile, has been classified as data deficient by the IUCN (2000). Not much scientific information is available about this species. No hematologic reference values have been published to date, which makes health controls of wild and captive pichis difficult. The proposed work aims at collecting basic data about the health status, hematology and parasitological infestation of wild *Zaedyus pichiy* populations in Mendoza Province, Argentina. Such parameters of healthy, wild animals are crucial for a better sanitary control of wild and captive pichi populations. This project will lay the foundation for further studies about *Zaedyus pichiy*, in which the survival of reintroduced individuals will be studied. The data collected in the proposed work will allow an evaluation of the health status of pichis before reintroducing them into the wild, thus preventing the release of pathogens or parasites that could pose a threat to the extant pichi populations.

A Preliminary Survey of the Edentates of the Dry and Wet Chaco of Argentina – Eduardo Fernandez-Duque. The project will conduct a preliminary survey of edentates in the Gran Chaco region of Formosa Province in Argentina. The objectives are: 1) to identify a population of giant armadillos in the dry portion of Formosa Province amenable for long-term studies, 2) to conduct a quantitative survey of edentates in the wet region of Formosa Province, 3) to support the training of Argentinean students who will become responsible for the development of long-term studies on edentates in the area. Information from the study will be used in the development of a conservation education program to be started in 2002 in collaboration with the Conservation Education Department of the San Diego Zoo and the Provincial Wildlife Department in Formosa. The study will also be

the first step in developing a research program on edentates in the province of Formosa. In the wet region of Formosa, systematic censuses of edentates will be conducted in Estancia Guaycolec, a cattle ranch where Fernandez-Duque has been working since 1996. To find a suitable area to work with giant armadillos will require the exploration of vast areas in collaboration with knowledgeable local guides.

Health Survey and Normal Physiologic Values of the Wild Giant Anteater (*Myrmecophaga tridactyla*) in the Brazilian Highlands – Don Gillespie. The giant anteater (*Myrmecophaga tridactyla*) currently ranges over wide areas of South America, with the Brazilian highlands considered among the prime habitat for the species. Even there, the population is estimated to have declined to 25% of the population present 25-30 years ago. Being somewhat specialized from a dietary viewpoint, pressures from rapid land development and overhunting may soon push this rare species to the threatened species list. It is crucial, therefore, to complete a number of timely surveys, including health assessments to ensure that protected areas in this part of Brazil maintain viable populations of the giant anteater in the future. Wild giant anteaters in the Serra da Canastra National Park in the state of Minas Gerais, Brazil, will be assessed for underlying health problems, and these data will be used to build a comparative profile of normal physiologic values for use in captive management, in field collection, and conservation techniques. Results will be compared to the ISIS database and the current U.S. zoo population.

Lista das Espécies da Fauna Ameaçadas de Extinção no Rio Grande do Sul, Brasil

A iniciativa de elaborar a primeira lista das espécies da fauna ameaçadas de extinção no Rio Grande do Sul surgiu de forma independente em dois grupos de pesquisadores gaúchos. No final de 1999, a associação ambientalista PANGEA, com o apoio da Fundação Biodiversitas, estabeleceu

contatos com a Secretaria Estadual do Meio Ambiente (SEMA) e com alguns pesquisadores gaúchos no sentido de dar início ao processo de elaboração de uma lista a ser sancionada por decreto governamental.

Paralelamente, em agosto do mesmo ano, teve início o projeto Livro Vermelho da Fauna Ameaçada de Extinção no Rio Grande do Sul, do Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul (MCT-PUCRS), com a proposta mais ampla de elaborar, além de uma lista, também um livro sobre as espécies ameaçadas no Estado, gerenciando as informações através de uma base de dados permanentemente atualizável.

Para evitar a duplicidade de esforços e elaborar uma lista única, as equipes foram reunidas sob coordenação geral do “Projeto Livro Vermelho”, contando com apoio da SEMA através da Fundação Zoobotânica do Rio Grande do Sul. A lista aqui apresentada resulta do trabalho desenvolvido desde então. Ela foi elaborada a partir do esforço conjunto de 43 zoólogos diretamente vinculados ao projeto, representando 18 instituições de pesquisa, e 128 colaboradores.

Com o propósito de formalizar o apoio da Secretaria Estadual do Meio Ambiente ao Projeto Livro Vermelho e encaminhar o processo de homologação da lista pelo Governo do Estado, um convênio entre o MCT-PUCRS e a SEMA foi firmado em agosto de 2001. Posteriormente, em 5 de dezembro do mesmo ano, os resultados de dois anos de trabalho do projeto foram sinteticamente apresentados à sociedade gaúcha em uma audiência pública organizada pela SEMA. Participaram representantes do poder público estadual e federal, organizadores da lista, zoólogos vinculados ao projeto, colaboradores, pesquisadores, técnicos e representantes de organizações não governamentais, além da comunidade.

Ao final, 261 espécies foram classificadas como efetivamente ameaçadas de extinção no Rio

TABELA 1. Número de espécies ameaçadas no Rio Grande do Sul por grupo zoológico e categoria de ameaça. As siglas seguem recomendação da IUCN, utilizando a grafia inglesa para facilitar a consulta por pesquisadores de diferentes nacionalidades.

Grupo	Categorias de Ameaça					Total
	RE	PE	CR	EN	VU	
Esponjas				1	2	3
Moluscos				6	11	17
Crustáceos					7	7
Insetos				7	11	18
Peixes			4	6	18	28
Anfíbios					10	10
Répteis				5	12	17
Aves	2	8	31	42	45	128
Mamíferos		1	8	5	19	33
Total	2	9	43	72	135	261

RE – Regionalmente extinto; **PE** – Provavelmente extinto; **CR** – Criticamente em perigo; **EN** – Em perigo; **VU** - Vulnerável.

Grande do Sul, enquadrando-se nas categorias de ameaça descritas no texto do decreto (Tabela 1).

Com relação aos edentatas, *Myrmecophaga tridactyla* Linnaeus, 1758 foi classificada como Criticamente em Perigo (CR) e *Tamandua tetradactyla* (Linnaeus, 1758) como Vulnerável (VU). A destruição e descaracterização dos habitats constituem as principais fatores que representam ameaça às populações de edentatas no Estado. Como medidas para conservação desses táxons são sugeridas a proteção e recuperação do habitat, juntamente com programas de educação ambiental e estudos de auto-ecologia.

Ana Alice B. de Marques, Universidade do Vale do Rio dos Sinos, Avenida Unisinos, 950, 93022-000 São Leopoldo, RS, Brasil. E-mail: <anaalice@cpovo.net>.

Carla S. Fontana, Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Avenida Ipiranga, 6681, Caixa Postal 1429, 90619-900 Porto Alegre, RS, Brasil.

Eduardo Vélez, Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul,

Rua Dr. Salvador França 1427, 90690-000 Porto Alegre, RS, Brasil.

Glayson A. Bencke, Laboratório de Ornitologia, Fundação Zoobotânica do Rio Grande do Sul, Rua Dr. Salvador França 1427, 90690-000 Porto Alegre, RS, Brasil.

Maurício Schneider, Departamento de Zoologia, Universidade Federal do Rio Grande do Sul, Avenida Bento Gonçalves 9500, Bloco IV, pr. 43435, 90540-000 Porto Alegre, RS, Brasil.

Roberto E. dos Reis, Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Avenida Ipiranga, 6681, Caixa Postal 1429, 90619-900 Porto Alegre, RS, Brasil.

Reference

Marques, A. A. B., Fontana, C. S., Vélez, E., Bencke, G. A., Schneider, M. and Reis, R. E. 2002. *Lista das Espécies da Fauna Ameaçadas de Extinção no Rio Grande do Sul. Decreto nº 41.672, de 11 de junho de 2002.* FZB/MCT-PUCRS/PANGAEA, Porto Alegre. 52pp.

Sophie Danforth Conservation Biology Fund

Roger Williams Park Zoo accepts proposals for the Sophie Danforth Conservation Biology Fund of the Rhode Island Zoological Society. Annual awards of up to \$1000 are granted to conservation programs that protect threatened wildlife and habitats worldwide. Field studies and other projects that demonstrate a multi-disciplinary approach to biodiversity and ecosystem conservation, as well as projects that involve in-country collaborators, receive highest funding priority. Environmental education programs, development of techniques that can be used in a natural environment, and captive propagation programs that stress an integrative approach to conservation are also appropriate. Deadline for submissions is May 31. Grant recipients will be notified by September 3. Proposal guidelines and additional information are

available on the Roger Williams Park Zoo website at: <www.rogerwilliams-parkzoo.org>, in the Conservation section, or may be acquired by contacting Stacia Martin at <smartin@rwpzoo.org>.

The Lincoln Park Zoo Neotropic Fund

The Lincoln Park Zoo Neotropic and Africa/Asia Funds support field research in conservation biology around the world. The Neotropic fund focuses on projects undertaken in Latin America and the Caribbean. Since 1986, the fund has awarded over 150 grants in 19 countries. The Africa/Asia Fund, launched in 1997, focuses on projects throughout Africa, Asia, and the Pacific. The funds emphasize 1) the support of graduate students and other young researchers, 2) direct impact on wildlife conservation and/or conservation biology, 3) involvement by students and/or local field assistants from Latin America, Africa, or Asia at levels that engender appreciation for wildlife conservation, and 4) links to either the Lincoln Park Zoo animal collection or conservation activities of the zoo staff. Each fund typically supports between five and ten projects annually, including project renewals for a second year. Most awards fall into the range of \$3,000-\$6,000. Initial support is for up to 12 months from the date of award, and the maximum duration of support is two years. The current deadline for receipt of Neotropic and Africa/Asia proposals is October 1st. For additional information and application procedures go to <www.lpzoo.com/conservation>, e-mail: <conservation@lpzoo.org>, or write to: Lincoln Park Zoo NF/AA Funds, Department of Conservation and Science, Lincoln Park Zoo, 2001 N. Clark St., Chicago, IL 60614.

Version 2.0 of Ramas Red List Software Available

Version 2.0 of the RAMAS[®] software, used for assessing the conservation status of species

for possible inclusion in the IUCN Red List of Threatened Species, is now available. The software incorporates the revised Red List Categories (2000) (see below). To purchase a copy, please contact Isabelle Weber, IUCN/SSC, Rue Mauverney 28, CH-1196 Gland, Switzerland, Fax: +41-22-9990015; e-mail: <isc@iucn.org> or Applied Biomathematics, 100 North Country Road, Setauket, NY 11733, USA, Fax: +1 516-751-3435. Single-user and site-licensed copies of the software are priced at US\$295 and US\$445 respectively. From: *IUCN Species Survival Commission (SSC) E-Bulletin - May 2001*. Anna Knee, Communications Officer, SSC/IUCN.

The Automated Telemetry Project: Studying Species Interactions in a Tropical Forest

Presently being installed on Barro Colorado Island (BCI), Republic of Panama, the premier field station of the Smithsonian Tropical Research Institute, an automated telemetry system will permit the radio-tracking of tagged animals on a large scale in a tropical forest. The project is being funded by the Celerity Foundation, Gray Island Systems and the Smithsonian Tropical Research Institute and will address many of the most important questions in biology and conservation including: species interactions and the evolution of diversity, competition, predation, seed dispersal, effects of fragmentation and human disturbance. Applying telemetry will also allow for the ability to consistently find a study animal, which opens up future possibilities to research behavior, eco-physiology, disease, etc.

The project will be using an automated telemetry system designed by William Cochran, and described by Larkin *et al.* (1996). The system uses a scanning receiver which measures the relative signal strength from an array of six directional antennas to estimate the direction of a transmitter. The correct placement of towers should provide good coverage of the entire island for large terrestrial animals and medium sized high-flying animals, and respectable coverage for smaller animals.

Initial tests suggest an accuracy of about 5 degrees in direction finding. Wireless communication will link each receiver to the main lab and will allow the transmission of data back to the lab in real time which will be used to triangulate location of the animal. Data will be immediately available online through software provided by Gray Island Systems and will be used both for educational purposes, open to the general public, and also through password protected areas available only to researchers involved in specific projects. Presently, three initial projects are planned to test the system, which will hopefully include a study of ocelots, high flying bats, and large frugivorous bats.

For further information contact: Roland Kays, Ph.D., Curator of Mammals, New York State Museum, CEC 3140, Albany, NY 12230, Tel: 518-486-3205, Fax: 518-486-2034, email: <rkays@mail.nysed.gov>, <<http://www.princeton.edu/~wikelski/research/index.htm>>.

Reference

Larkin, R. P., Raim, A. and Diehl, R. H. 1996. Performance of a nonrotating direction-finder for automatic radio tracking. *Journal of Field Ornithology* 67: 59-71.

Mammalian Species

Mammalian Species, editor Virginia Hayssen, is published regularly by the American Society of Mammalogists with 25-30 new accounts issued each year. Each account summarizes the current understanding of the biology of a single species, including systematics, distribution, fossil history, genetics, anatomy, physiology, behavior, ecology, and conservation. The American Society of Mammalogists have now put 631 mammalian species accounts online as PDF files, and subscriptions to the series are also available for \$30.00 per year. For more information on the series email David Stadler at Allen Press: <dstadler@allenpress.com> or visit the *Mammalian Species* website at <www.science.smith.edu/departments/Biology/VHAYSEN/msi/msiaccounts.html>.

Ecología Austral

Ecología Austral is the scientific journal of the Argentine Ecological Society. It publishes original scientific articles on any area of the environmental sciences. Articles may be (1) Original research: results of field, experimental or theoretical research, (2) Reviews: papers reviewing the present knowledge of a topic, and (3) Short communications: short papers reporting on a minor work representing an improvement in general knowledge or a methodological development. Articles are peer-reviewed by at least two referees. Manuscripts are accepted in Spanish, English or Portuguese. The Editor-in-Chief is seeking the help of reviewers in any of the three languages of the journal. To this end, a database is being developed (about 120 reviewers already entered), in order to have a wide range of expertise available, and also to avoid requesting reviews from the same expert too frequently. For those interested in volunteering for the peer review process please send a message to: Dr. Jorge Rabinovich, Editor, *Ecología Austral*, e-mail: <ecol_au@netverk.com.ar>. From: NeoCons 1(2), April 2001, Neotropical Conservation Biology Bulletin: <<http://www.conservationbiology.org/SCB/Publications/NeoCons/>>.

Revised Red List Criteria

The new improved categories and criteria used for listing plants and animals on the IUCN Red List of Threatened Species are now available, after a four-year review which was called for by IUCN members. The review, coordinated by SSC, involving broad consultation with users and organizations from around the world, has produced a clearer, more open, and easy-to-use system for assessing species. With particular attention paid to marine species, harvested species, and population fluctuations, the review has refined the effectiveness of the Red List categories and criteria as indicators of extinction risk.

See <<http://www.iucn.org/themes/ssc/redlists/RLcategories2000.html>> for more details. From: *IUCN Species Survival Commission (SSC) E-Bulletin - March 2001*. Anna Knee, Communications Officer, SSC/IUCN.

International Foundation for Science

Excerpt from the IFS website: IFS is an NGO providing support to developing country scientists to conduct, in a developing country, relevant and high quality research on the management, use, and conservation of biological resources and their environment. IFS believes that the interests of both science and development are best served by promoting and nurturing the research efforts of young science graduates, who are at the beginning of their research careers. Since 1974, IFS has provided support, mainly in the form of small research grants, to over 3,200 scientists in 99 developing countries.

IFS support is primarily financial and in the form of a research grant in the amount of up to USD 12,000, which may be renewed twice. Each grant is for one research period, normally not less than one year nor more than three years and is intended for the purchase of the basic tools needed to conduct a research project: equipment, expendable supplies, and literature. It cannot be used for education, travel, or the applicant's salary. However, a PhD Fellowship (Carolina MacGillivray Fellowship) is available for applicants from the SADC countries. IFS research areas include: Aquatic Resources, Animal Production, Crop Science, Forestry/Agroforestry, Food Science, and Natural Products. A wide interpretation of these scientific disciplines is encouraged, as long as scientific research is proposed, and not a transfer of already-existing technology. Researchers must also ask themselves how their research will affect, or be affected by, local ecological and socio-economic conditions where the research is likely to be implemented.

The applicant for an IFS Research Grant must satisfy the following criteria: be a scientist and a citizen of a developing country, have at least a MSc or equivalent degree, be under 40 years of age (30 for Chinese applicants), be working at a university or research institution in a developing country (the institution is expected to provide salaries and basic research facilities), will do research in one of the IFS Research Areas and do the research in a developing country. The selection process is rigorous with considerable competition for the available grants. The applications are judged by an international panel of Scientific Advisers on the basis of the applicant's personal qualifications, the scientific quality and feasibility of the proposal, and the relevance of the planned research results. For more information see: <<http://www.ifs.se/>> or email:<info@ifs.se>.

9th International Mammalogical Congress

The Congress Committee for MAMMAL2005 (the 9th International Mammalogical Congress; formerly the International Theriological Congress: ITC) has been launched. The Congress Committee will periodically inform about the preparation of MAMMAL2005 through e-mail and the official website (<<http://www.imc9.jp/>>), which is now fully operational. Though we are now managing e-mail addresses based on members lists of the 7th and 8th ITC and several mammalogical organizations, we would like to renew the list of addresses for MAMMAL2005. If you are you interested in MAMMAL2005, please reply to <MAMMAL2005@hokkaido-ies.go.jp>. If you have a colleague who is interested in MAMMAL2005, please recommend him/her to contact us at <MAMMAL2005@hokkaido-ies.go.jp>: Koichi Kaji and Takashi Saitoh (Secretary General). For more information, please contact: Tomoko Takahashi (Secretary), e-mail: <tomochaz@kmail.plala.or.jp>.

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The AZA Annual Conference Proceedings from Saint Louis are now available for purchase. Members can receive a copy for \$45. Please log on to AZA's website at <www.aza.org>, and click on "Publications" for more information on how to order a copy. An order form can be downloaded from the website and should be filled out and returned to the AZA Publications Department with a check or money order drawn from a U.S. bank. If you have any questions, please feel free to contact the Publications Department at 301-562-0777, ext. 253 or ext. 247.

CITES: A Conservation Tool – New Edition Available

The IUCN/SSC Wildlife Trade Programme has completed the seventh edition of *CITES: A Conservation Tool, A Guide to Amending the Appendices to the Convention on International Trade in Endangered Species of Wild Fauna and Flora*. This publication guides the CITES Parties through the Convention's articles and resolutions and covers the process for the submission, presentation, and adoption of proposals to amend the Appendices for the 12th CITES Meeting of the Conference of the Parties (CoP 12, 3-15 November 2002, Chile). The seventh edition has been produced in booklet form and CD for the first time. The guide is available in PDF in English, French and Spanish. This guide forms part of a series of tools prepared by the Wildlife Trade Programme for CITES Scientific Authorities. These include a checklist and resource guide to help CITES Scientific Authorities make Non-Detriment Findings (a requirement for export of certain specimens) which will be published as an SSC Occasional Paper. The Programme is working with the CITES Secretariat to develop other tools and is providing input to technical

training workshops. The Analyses of Proposals to Amend the CITES Appendices will be produced in collaboration with the TRAFFIC Network for the 12th COP. For more information see: <<http://www.cites.org/eng/cop/12/prop/index.shtml>> or <<http://www.iucn.org/themes/ssc/programs/cites/cites.htm>>.

A Red Data Book for the Mammals of Ecuador

The Red Data Book for Ecuadorean Mammals (*Libro Rojo de Los Mamíferos de Ecuador*) is edited by Diego Tirira, S. It is an attractively produced and informative evaluation, in Spanish, of the threatened mammals of Ecuador. Authors of the treatments of the various mammal groups include: Carlos Boada (SIMBIOE), Santiago Burneo (Museo de Zoología, Pontificia Universidad Católica del Ecuador), Armando Castellanos (Fundación Zoobreviven, Quito), Cristina Castro, A. (Yaqu-Pacha, Organización para la Conservación de Mamíferos Acuáticos en Sudamérica), Francisco Cuesta (Fundación EcoCiencia, Quito), Stella de la Torre (Quito), Judith Denkinger (Yaqu-Pacha, Organización para la Conservación de Mamíferos Acuáticos en Sudamérica), Godfrey Merlen (Estación Científica Charles Darwin, Galápagos), Sandie Salazar (Estación Científica Charles Darwin, Galápagos), Luis Suárez (Fundación EcoCiencia, Quito), Diego Tirira, S. (SIMBIOE) and Victor Utreras, B. (Wildlife Conservation Society – Ecuador). The list of threatened species was the result of two years' work and the participation of more than thirty people. Following training in threatened species assessment and the use of the 2000 IUCN criteria given by the IUCN/SSC Red List program staff, the list was finalized at a workshop organized by SIMBIOE and the Fundación EcoCiencia in Quito, September 2000.

Each threatened species is nicely illustrated, with information on the distribution, current status, principal threats, and measures already undertaken and measures proposed for their conserva-

tion. The IUCN 2000 criteria are used for the assessments (IUCN, 2001). In the introduction, Diego Tirira, Francisco Cuesta and Luis Suárez explain that Ecuador has the richest biodiversity per unit area of any country in the world. They report 369 mammal species, 12 of which are edentates. The book includes some valuable analyses of the biogeography and status of Ecuadorean mammals in general by Santiago Burneo and Diego Tirira. Nine of the 13 mammal orders in Ecuador have threatened species. Forty-nine mammals are listed as threatened, and four orders account for nearly 78% of them – Rodents 14 of 100 species, Carnivora 11 of 31 species, Cetacea 7 of 33 species and Chiroptera 6 of 132 species. Of the 12 edentate species Tirira recognizes for Ecuador, the following are listed as threatened: Near threatened (NT) – *Cabassous centralis*; Data Deficient (DD) – *Cabassous unicinctus*, *Choloepus hoffmanni*, *Cyclopes didactylus*, *Dasyopus kappleri*, *Myrmecophaga tridactyla*, *Priodontes maximus*.

Two books to accompany this one are *Biología, Sistemática y Conservación de los Mamíferos del Ecuador* (1998) and *Mamíferos del Ecuador* (1999), both also by Diego Tirira. The first is an edited volume, which reviews numerous aspects of Neotropical mammalogy and Ecuadorean mammals in particular. The second is a more formal review of the diversity, distributions and taxonomy of Ecuadorean mammals, including chapters on diversity, Ecuadorean species and their distributions, an identification guide, bibliography and scientific collections. Besides the species mentioned above in the Red Data Book, Tirira (1999) lists for Ecuador – *Bradypus variegatus*, *Choloepus didactylus*, *Dasyopus novemcinctus*, *Tamandua mexicana* and *T. tridactyla*.

The Red Data Book is available from: SIMBIOE, Av. Amazonas 2915 e Inglaterra, Edificio Inglaterra, Piso 2, Apartado 17-11-6025, Quito, Ecuador, Tel: (593-2) 431-097 or 452-596, Fax: (593-2) 442-771; e-mail: <mamiferosdeecuador@yahoo.com>.

References

- IUCN. 2001. *IUCN Red List Categories and Criteria. Version 3.1*. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.
- Tirira S., D. (ed.) 1998. *Biología, Sistemática y Conservación de los Mamíferos del Ecuador*. Publicación Especial 1. Museo de Zoología. Centro de Biodiversidad y Ambiente, Pontificia Universidad Católica del Ecuador y Sociedad para la Investigación y Monitoreo de la Biodiversidad Ecuatoriana (SIMBIOE), Quito. 217pp. ISBN 9978-40-434-1.
- Tirira S., D. 1999. *Mamíferos del Ecuador*. Publicación Especial 2. Museo de Zoología. Centro de Biodiversidad y Ambiente, Pontificia Universidad Católica del Ecuador y Sociedad para la Investigación y Monitoreo de la Biodiversidad Ecuatoriana (SIMBIOE), Quito. 392pp. ISBN 9978-40-835-5.
- Tirira S., D. (ed.) 2001. *Libro Rojo de Los Mamíferos de Ecuador*. Sociedad para la Investigación y Monitoreo de la Biodiversidad Ecuatoriana (SIMBIOE) / Ecociencias / Ministerio del Ambiente / UICN. Serie Libros Rojos del Ecuador, Tomo 1. Publicación Especial sobre los Mamíferos del Ecuador. 236pp. ISBN 9978-41-614-5.

Books

Lessons from Amazonia: The Ecology and Conservation of a Fragmented Forest, edited by Richard O. Bierregaard Jr., Claude Gascon, Thomas E. Lovejoy and Rita Mesquita. 2001, 478pp. Yale University Press, NY. ISBN 0-300-08483-8 (Cloth). Price: \$65.00. The foreword is by Edward O. Wilson, and prologue by Eneas Salati. This book presents the results of the longest-running and most comprehensive study of forest fragmentation ever undertaken, the Biological Dynamics of Forest Fragments Project (BDFF), north of Manaus, in central Amazonia, run jointly by the Smithsonian Institution and the National Institute for Amazon Research (INPA). Forest fragmentation is one of the

biggest research fields in tropical conservation biology, and this book provides a remarkable overview of many of the key issues, presenting the experimental research, inventories and long-term monitoring of biotic and abiotic aspects of forest fragments of different sizes since 1979 when the project was begun. It is divided into five parts: 1. Theory and overview (4 chapters); 2. Forest ecology and genetics (4 chapters); 3. Fragmentation effects on plant communities (5 chapters), on invertebrate communities (5 chapters), and on vertebrate communities (4 chapters); 4. Management guidelines (6 chapters), and 5. Synthesis (1 chapter on principles of forest fragmentation and conservation in the Amazon). *Available from:* Yale University Press, in the US (toll-free) – Tel: 1-800-405-1619, Fax: 1-800-406-9145, e-mail: <customer.care@trilateral.org>; in Canada, Mexico, South America, Japan, South Korea, Taiwan, or Australia – Customer Service Dept., Tel: 401-531-2800, Fax: 401-531-2801; in the United Kingdom, Europe, Africa, or Asia – London office, Tel: 44-207-431-4422, Fax: 44-207-431-3755, e-mail: <sales@yaleup.co.uk>. Website: <<http://www.yale.edu/yup/books/084838.htm>>.

Experimental Design and Data Analysis for Biologists, by Gerry P. Quinn, Monash University and Michael J. Keough, University of Melbourne, 2002, Cambridge University Press. Price: \$110.00 (Hardbound), ISBN: 0-521-81128-7. Price: \$45.00 (Paperback), ISBN: 0-521-00976-6. Statistical analysis is at the core of most modern biology, and many biological hypotheses, even deceptively simple ones, are matched by complex statistical models. Prior to the development of modern desktop computers, determining whether the data fit these complex models was the province of professional statisticians. Many biologists instead opted for simpler models whose structure had been simplified quite arbitrarily. Now, with immensely powerful statistical software available to most of us, these complex models can be fitted, creating a new set of demands and problems for biologists. We need to know the pitfalls and assumptions of particular statistical models, be able to identify the type of model appropriate

for the sampling design and kind of data that we plan to collect, be able to interpret the output of analyses using these models, and be able to design experiments and sampling programs optimally, i.e. with the best possible use of our limited time and resources. The analysis may be done by professional statisticians, rather than statistically trained biologists, especially in large research groups or multidisciplinary teams. In these situations, we need to be able to speak a common language: frame our questions in such a way as to get a sensible answer, be aware of biological considerations that may cause statistical problems – we can not expect a statistician to be aware of the biological idiosyncrasies of our particular study, but if he or she lacks that information, we may get misleading or incorrect advice – and understand the advice or analyses that we receive, and be able to translate that back into biology. This book aims to place biologists in a better position to do these things. It arose from our involvement in designing and analyzing our own data, but also providing advice to students and colleagues, and teaching classes in design and analysis. As part of these activities, we became aware, first of our limitations, prompting us to read more widely in the primary statistical literature, and second, and more importantly, of the complexity of the statistical models underlying much biological research. In particular, we continually encountered experimental designs that were not described comprehensively in many of our favorite texts. This book describes many of the common designs used in biological research, and we present the statistical models underlying those designs, with enough information to highlight their benefits and pitfalls. Our emphasis here is on dealing with biological data – how to design sampling programs that represent the best use of our resources, how to avoid mistakes that make analyzing our data difficult, and how to analyze the data when they are collected. We emphasize the problems associated with real world biological situations. Where to order: Cambridge University Press, 40 West 20th Street, New York, NY, 10011-4211, USA. Tel: (800) 872-7423 Fax: (914) 937-4712, website: <<http://www.cambridge.org>>.

Diversidad y Conservación de los Mamíferos Neotropicales, edited by Gerardo Ceballos and Javier A. Simonetti, Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) and Universidad Nacional Autónoma de México, México, DF. 2002. 582pp. ISBN 970-9000-18-7. This edited volume provides excellent country-by-country reviews of the mammal faunas of South America, Costa Rica, Cuba, Panama, and Mexico. In Spanish but with English abstracts. The Prologue is by Michael Mares (Oklahoma Museum of Natural History and Department of Zoology, University of Oklahoma). Contents: Mamíferos de Argentina – R. A. Ojeda, C. E. Borghi & V. G. Roig, pp. 23-63; Mamíferos de Bolivia – J. G. Bravo, T. L. Yates & L. M. Zalles, pp.65-113; Mamíferos de Brasil – C. J. R. Alho, M. L. Reis & P. Seixas, pp.115-150; Mamíferos de Chile – J. E. Mella, J. A. Simonetti, A. E. Spotorno & L. C. Contreras, pp.151-183; Mamíferos de Colombia – M. Alberico & V. Rojas-Díaz, pp.185-226; Mamíferos de Costa Rica – D. E. Wilson, R. M. Timm & F. A. Chinchilla – pp.227-253; Mamíferos de Cuba – G. S. Taboada, pp.255-270; Mamíferos de Ecuador – L. Albuja V., pp.271-327; Mamíferos de Guyana – M. D. Engstrom & B. K. Lim, pp.329-375; Mamíferos de México – G. Ceballos, J. Arroyo-Cabrales & R. A. Medellín, pp.377-413; Mamíferos de Panamá – R. Samudio Jr., pp.415-451; Mamíferos de Paraguay – P. Myers, A. Taber & I. G. de Fox, pp.453-502; Mamíferos de Perú – V. Pacheco, pp.503-549; Mamíferos de Uruguay – P. O. Baes, S. Sühling & G. Ceballos, pp.551-565; Mamíferos de Venezuela – G. Ceballos, P. O. Baes, S. Sühling, Y. Domínguez & H. Zarza, pp.567-582. *Available from:* Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO), Liga periférico-Insurgentes sur 4903, Col. Parques del Pedregal, Tlalpan, 14510, México, DF, México.

Biology, Medicine, and Surgery of South American Wild Animals, edited by Murray E. Fowler and Zalmir S. Cubas, 2001, 536pp. Iowa State University Press, Ames, Iowa. ISBN 0 8138 2846-5. Price US\$89.65. An extraordinary compilation of continent-specific coverage of

amphibians, birds, reptiles and all South American mammals arranged by order and genus. Topics include conservation efforts, diseases in free-ranging populations, and management of animals in captivity. Special coverage is given to general health topics such as nutrition, ophthalmology and dentistry. Pages 238 to 255 are dedicated to the Xenarthra, with the following contributions: Biology and Captive Management of Armadillos and Anteaters – Ana Maria Beresca and Kátia Cassaro, pp.238-245; Biology and Captive Management of Sloths – Carlos Esbérard, pp.245-246; Husbandry – Antônio Messias-Costa and Carlos Esbérard, pp.246-247; Medicine and Neonatal Care of Sloths – Antônio Messias-Costa, pp.247-249; General Medicine – Lilian de Stefani Munão Diniz, pp.249-255. An excellent compendium and difficult to believe that any zoo or breeding institution could do without it. Available from: Iowa State University Press, 212 South State Avenue, Ames, IA 50014, USA, Tel: 800 862 6657, 515 292 0155, Fax: 515-292-3348. Website: <www.isupress.com>.

The New Encyclopaedia of Mammals, edited by David W. Macdonald, Assistant Editor Sasha Norris. 2001. Oxford University Press, Oxford. 930pp. ISBN 0 19 850823 9. Price £35.00. Unsurpassed in the breadth and depth of its text and the scope of its illustrations, this book treats every living species of mammal from aardvark to antechinus and from zebra to zorros, and all of the edentates besides. Each entry gives a systematic account of a species' or group's form, diet, distribution, behaviour, natural history, and conservation status. The very latest discoveries of new species are also included, making this the most comprehensive and up-to-date resource available. The text is augmented by numerous illustrations which combine the best of wildlife photography with superb detailed colour artwork. 'Factfile' panels with distribution maps and scale drawings give readers an instant overview of key data. It is the completely revised successor to *The Encyclopaedia of Mammals* published in 1984 (George, Allen and Unwin, London). The book itself claims to be the definitive reference work on mammals for the 21st Century and nobody

could argue with that right now. It is a spectacular book and an extremely valuable, an essential reference for any zoologist. Its price is accessible – it is a great bargain. The advisory editors were Hans Kruuk (Centre for Ecology and Hydrology, Banchory, UK), Richard Connor (University of Massachusetts, Dartmouth, USA), John Harwood (Gatty Marine Laboratory, University of St. Andrew's, UK), Guy Cowlshaw (Institute of Zoology, London, UK), John du Toit (Mammals Research Institute, University of Pretoria, South Africa), Jerry O. Wolff (University of Memphis, Tennessee, USA), Christopher R. Dickman (University of Sydney, Australia), and Gareth Jones (University of Bristol, Bristol, UK). The artwork is by Priscilla Barrett, Denys Ovenden, Malcolm McGregor, Michael R. Long and Graham Allen. Edentates (a general introduction) – Christopher R. Dickman, pp.786-787; Anteaters – Virginia Naples, pp.788-791; Sloths – Christopher R. Dickman, pp.792-795; Armadillos – Colleen McDonough & W. Jim Loughry, pp.796-799. *Available from:* Direct Sales Department, Oxford University Press, Saxon Way West, Corby, Northhamptonshire NN18 9ES, UK. By e-mail: <book.orders@oup.co.uk>. Website: <www.oup.co.uk>.

Diversidade Biológica e Cultural da Amazônia, edited by Ima Célia Guimarães Vieira, José Maria Cardoso da Silva, David Conway Oren and Maria Ângela D'Incao. 2001, Museu Paraense Emílio Goeldi, Belém, Pará, Brazil. 421pp. ISBN 85 7098 067 1. Price \$25.00 (+ US\$5.00 p&p outside of Brazil). In English and Portuguese. The results of a symposium celebrating the 130th anniversary of the Museu Paraense Emílio Goeldi, Belém, 23-27 October 1996 – “The Biological and Cultural Diversity of Amazonia in a World of Transformation”. The book covers three basic questions: What is the origin of Amazonian biodiversity?; What is the origin of the region's cultural diversity?; and How to promote the sustainable use of biodiversity in the Amazon? *Contents:* Part I. Origin of Biodiversity in Amazonia. The Amazonian rainforest only some 6-5 million years old – N.-A. Mörner, D. Rosetti & P. M. de Toledo, pp.3-18; Paleoecology

of Amazonia – T. Van der Hammen, pp.19-44; Hypotheses to explain the origin of species in Amazonia – J. Haffer, pp.45-118; Avian diversification in Amazonia: evidence for historical complexity and a vicariance model for a basic diversification pattern – J. Bates, pp.119-137; Molecular phylogenetics and the diversification of Amazonian mammals – J. Patton & M. N. F. da Silva, pp.139-164. Part II. Human and Cultural Diversity. Diversidade genética de populações humanas na Amazônia. – D. de F. Lobato da Silva, A. K. C. Ribeiro dos Santos & S. E. Batista dos Santos, pp.167-193; Amazônia socioambiental – sustentabilidade ecológica e diversidade social – D. Lima & J. Pozzobon, pp.195-251; Um aspecto da diversidade cultural do caboclo – R. H. Maués, pp.253-272; Science and the representation of nature in Amazonia: from La Condamine through Da Cunha to Anna Roosevelt – D. Cleary, pp.273-296. Part III. Sustainable Use of Biodiversity in Amazonia. As ciências, o uso de recursos naturais na Amazônia e a noção de desenvolvimento sustentável: por uma interdisciplinaridade ampla – F. de Assis Costa, pp.299-318; Natural vs. social science concepts in applied research on Amazônia: a critical assessment – M. Nitsch, pp.319-346; Domestication of Amazonian fruit crops – past, present, future – C. R. Clement, pp.347-367; Dinâmica evolutiva em roças de caboclos amazônicos – P. S. Martins, pp.369-384; Influence of habitat on the sustainability of mammal harvests in the Peruvian Amazon – R. Bodmer, P. Puertas, R. Aquino & C. Reyes, pp.385-402; Biodiversity: today's and tomorrow's importance – W. Kerr, pp.403-409. Part IV. Tributes. La Penha: gerador e gerenciador de ciência – L. M. F. Bassalo, pp.413-416; Paulo Sodero: mestre por excelência – I. C. G. Vieira, p.417; Jorge Pozzobon, agora no céu com diamantes, M. Meira, pp.419-421. *Available from:* Biblioteca, Museu Paraense Emílio Goeldi, Caixa Postal 399, 66040-170 Belém, Pará, Brazil. Website: <www.museu-goeldi.br>.

Técnicas de Coleta e Preparação de Vertebrados, edited by Paulo Auricchio and Maria da Graça Salomão (eds.), 2002. This 350-page book in Portuguese is the first Brazilian compilation of

techniques used for the preparation of vertebrates to be included in museum collections. Chapters, written by nine authors, include discussion of diaphanization; infiltration of paraffin; preparation of skins; cytogenetic, enzymatic and molecular techniques; museum curacy and legal aspects of field work and animal maintenance in Brazil. The book is well illustrated and is a good reference for researchers, technicians, teachers and students who are interested in taxidermy. To order from Brazil: send a FAX to: + 55 11 4655 2731 with your mailing address and the bank deposit receipt from the Instituto Pau Brasil. Payment should be made by bank deposit to: Instituto Pau Brasil, Banco do Brasil, Branch 1476-1, - Arujá - SP, Current account 5682-0. To order from outside Brazil: please arrange for a wire transfer to be made from your account to Instituto Pau Brasil, Banco do Brasil, Branch 1476-1, Arujá, São Paulo, Current account 5682-0. For further information, contact: Paulo Auricchio, e-mail: <ipbhn@institutopaubrasil.org.br>.

Técnicas de Coleta e Preparação de Vertebrados, de Paulo Auricchio e Maria da Graça Salomão. Publicado pelo Instituto Pau Brasil de História Natural, é o primeiro livro brasileiro que reúne técnicas de coleta e preparação de vertebrados. Os nove autores reuniram os mais recentes procedimentos, sendo ricamente ilustrado para facilitar o entendimento das técnicas. Foi elaborado para servir como referência a uma vasta gama de interessados: pesquisadores, professores de ensino médio e estudantes, abrangendo técnicas de Taxidermia científica e didática desde Peixes à Mamíferos, diafanização, preparação científica e didática de esqueletos, infiltração em parafina, curtimento de peles, técnicas citogenéticas, enzimáticas e moleculares, um capítulo sobre coleções zoológicas e outro sobre procedimentos legais. Este livro pretende preencher a lacuna existente na área técnico científica do Brasil e ser um referencial na preparação e manutenção de material biológico de Vertebrados. 350 páginas; capa mole plastificada. R\$ 40,00 (não incluindo transporte). Pedidos: Enviar fax para (011) 46552731, com endereço e comprovante de depósito. Forma de pagamento (Depósito

em conta): Instituto Pau Brasil, Banco do Brasil, Agência 1476-1 c/c 5682-0.

Animal, The Definitive Visual Guide to the World's Wildlife, edited by Don E. Wilson and David Burnie, 2001, 624pp., DK Publishing, ISBN: 0-789-47764-5, over 4000 color photos and color illustrations. Price: £30.00. Researched by over 70 zoologists and naturalists this book covers over 2000 mammals, birds, amphibians, reptiles, fish and invertebrates. Principle consultants include: Juliet Clutton-Brock (Mammals) – Dr Francois Vuilleumier (Birds) – Richard Rosenblatt (Fish) – Chris Mattison (Reptiles) – Tim Halliday (Amphibians) – George McGavin (Arthropods) – Richard Barnes (Non-Arthropod Invertebrates). Available from: NHBS Mailorder bookstore, 2-3 Wills Road, Totnes, Devon, TQ9 5XN, UK, web site: <<http://www.nhbs.com>>. NHBS Stock Code: #119919W *hardback*.

The Trade in Wildlife: Regulation for Conservation, edited by Sara Oldfield. 2002. Earthscan Publications, London. ISBN 1 85383 954 X (hardback), 1 85383 959 0 (paperback). Price: £48.00 (hardback) and £17.95 (paperback). This book provides a critical assessment of how the trade in wildlife is currently regulated and the regulations are enforced. Through analysis of case studies and comparisons with the trade in illegal goods, it shows what the weaknesses are, and where the system is failing. It points the way to what must be done if conservation efforts are to be supported by trade regulations, and not undermined. *Contents*: Preface – Michael Meacher. Part 1. Background. The nature and extent of legal and illegal trade in wildlife; What is the goal of regulating wildlife trade?; Is regulation a good way to achieve this goal?; Regulatory design; Regulation, conservation and incentives; Control and the holy grail. Part 2. Systems Regulation and Enforcement. Compliance and enforcement mechanisms of CITES; The European Community wildlife trade regulations; Evolution, impact and effectiveness of domestic wildlife trade bans in India. Part 3. Case Studies. Regulation and protection: successes and failures in rhinoceros conservation; Elephant poaching and resource

allocation for law enforcement; Crocodiles: legal trade snaps back; Regulation of the timber trade; Bushmeat: traditional regulation of or adaptation to market forces; The impact of the proposal to list the devil's claw on Appendix II of CITES; The need for a better understanding of context when applying CITES regulations: the case of the Indonesian parrot – *Tanimar corella*. Part 4. Lessons from Illegal Trade in Other Goods. Lessons from the control of illegal trade in ozone-depleting substances, fisheries and timber; The controlled trade in drugs; Lessons from the trade in illicit antiquities; Conclusion: looking ahead: international wildlife regulation and enforcement. Contributors: S. Broa, T. Mulliken, D. Roe, N. Sinclair-Brown, B. Moyle, M. Murphree, J. C. Vasquez, D. Morgan, M. Misra, N. Leader-Williams, H. Jachmann, J. Hutton, G. Webb, S. Oldfield, W. Bowen-Jones, C. Lombard, P. du Plessis, P. Jepson, D. Brack, D. Lowe, N. Brodie and R. Cooney.

Other titles from Earthscan Publications include: *Policing International Trade in Endangered Species: The CITES Treaty and Compliance*, by Rosalind Reeve (£19.95 – paperback and £50.00 – hardback), and *Endangered Species, Threatened Convention: The Past, Present and Future of CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora*, edited by J. Hutton and B. Dickson (£14.95 – paperback and £35.00 – hardback). Available from: Earthscan, 120 Pentonville Road, London, N1 9BR, UK, Fax: +44 (0)20 7278 1142, e-mail: <earthinfo@earthscan.co.uk>. Website: <http://www.earthscan.co.uk>.

A Biodiversidade nos Grandes Remanescentes Florestais do Estado do Rio de Janeiro e nas Restingas da Mata Atlântica, por Carlos Frederico Duarte da Rocha, Helena de Godoy Bergallo, Maria Alice dos Santos Alves e Monique Van Sluys. 2003. RiMa Editora, Rio de Janeiro. 134pp. ISBN 85-86552-49-6. Parceria: Departamento de Ecologia, Instituto de Biologia, Universidade Estadual do Rio de Janeiro (UERJ), Instituto Biomas e Centro de Conservação da Biodiversidade da Conservation International do Brasil.

Apoio Fundação Brasileira para a Conservação da Natureza (FBCN). Roberto Cavalcanti, ex-Presidente da Conservation International do Brasil, escreveu, “Para conservar é preciso saber onde estão as oportunidades e o que tem de ser feito. Este livro apresenta um diagnóstico precioso do patrimônio natural remanescente no Estado do Rio de Janeiro. A obra comprova que o Estado é privilegiado em termos de biodiversidade e que, embora sejam gravíssimas as ameaças à sobrevivência das espécies únicas da região, a situação atual pode ser revertida a fim de melhorar o ambiente natural e garantir a qualidade de vida das pessoas e das espécies com que compartilhamos o planeta. Por meio de linguagem técnica mas acessível, os autores descrevem a geologia, o clima, os solos e a biota dos principais blocos de floresta do Rio de Janeiro, dando destaque às unidades de conservação e à sua biodiversidade. Mostram que os parques e reservas não estão ali por capricho ou acaso; sua função é conservar a biota nativa e permitir que gerações futuras possam continuar a coexistir com as espécies que sempre nos fascinaram. Trata-se de obra essencial para todos os envolvidos com conservação, planejamento e educação ambiental.” Sumário: Prefácio – L. P. Pinto, pp.ix-x; Apresentação, pp.ix-xiii. Parte I. O estado da Biodiversidade no Estado do Rio de Janeiro. 1. Os grandes blocos de remanescentes florestais no Estado do Rio de Janeiro, pp.3-32; 2. Esforço de conservação nos blocos de grandes remanescentes do Estado do Rio de Janeiro, pp.33-36; 3. Fatores predominantes de pressão de degradação nos grandes blocos de remanescentes florestais, p.37-42; 4. A relevância do estabelecimento de corredores interligando os grandes remanescentes florestais do Estado do Rio de Janeiro, pp.43-46; 5. Estado do conhecimento científico biológico nos grandes blocos de remanescentes florestais do Estado do Rio de Janeiro, pp.47-48; 6. Espécies endêmicas e ameaçadas de vertebrados terrestres no grandes blocos de remanescentes florestais do Estado do Rio de Janeiro, pp.49-67. Parte II. A Biodiversidade nas Restingas dos Corredores da Serra do Mar e Central da Mata Atlântica. 7. Diagnóstico do estado de conservação da biodiversidade das restingas do Corredor da Serra do Mar e do

Corredor Central da Mata Atlântica, pp.71-74; 8. Fatores predominantes de pressão de degradação nas restingas dos corredores e diversidade de vertebrados terrestres, pp.75-80; 9. A fragmentação dos habitats de restinga e a ordenação na extinção das espécies das comunidades de vertebrados terrestres, pp.81-84; 10. Esforço de conservação nas restingas do Corredor da Serra do Mar e do Corredor Central da Mata Atlântica, pp.85-88; 11. Vertebrados terrestres endêmicos e ameaçados, pp.89-100; 12. Indicadores biológicos para monitoramento da biodiversidade, pp.101-108; 13. Ampliação da extensão de áreas protegidas e criação de novas áreas para conservação nos grandes blocos de remanescentes florestais e nas restingas dos Corredores da Serra do Mar e Central da Mata Atlântica, pp.109-112; Recomendações, pp.113-116. *Para maiores informações:* Carlos Frederico Duarte da Rocha, Departamento de Ecologia, Instituto de Biologia Roberto Alcântara Gomes, Universidade Estadual do Rio de Janeiro, Rua São Francisco Xavier 524, Maracanã 20550-013, Rio de Janeiro, RJ, Brasil, e-mail: <cdfrocha@uerj.br>.

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MEETINGS

2004

Student Conference on Conservation Science, 24-26 March, 2004, Department of Zoology, University of Cambridge, UK. Plenary lectures by four leading figures in the field: Prof. Gretchen Daily (Stanford University), Prof. Kathy Home-wood (University College, London), Prof. John Reynolds (University of East Anglia) and Dr. Bob Watson (The World Bank and former Chair, IPCC). For more information see the website: <<http://www.zoo.cam.ac.uk/sccs>>.

International Fund for Animal Welfare – Forum on Wildlife Conservation, 17-20 June 2004, Limerick, Ireland. The International Fund for Animal Welfare (IFAW), in association with the University of Limerick, will be holding an international forum in Limerick, Ireland, from 17-20 June 2004. The theme of the forum is: Wildlife Conservation: In Pursuit of Ecological Sustainability. The objective of the forum is to focus attention on, and to advance the understanding of, issues surrounding the pursuit of ecologically sustainable use and the conservation of wildlife (including fisheries). The programme consists of approximately 24 invited lectures, and a limited number of contributed papers, which will be presented as posters. The programme is divided into five sessions: 1) The Global Context; 2) Modern Examples; 3) Factors at Play; 4) The Way Forward; 5) Theory into Practice.

The programme committee invites submission of abstracts to be considered for inclusion in the programme as contributed poster papers. Abstracts will be received until 1 February 2004. Abstracts should follow the guidelines described in the "Abstract Guidelines" section on the IFAW website. For more information on the Forum, including a list of confirmed speakers, please visit

<<http://www.ifaw.org/forum>> or contact Sheryl Fink at <sfink@ifaw.org>.

Association for Tropical Biology and Conservation 2004 Annual Meeting, 12-15 July 2004, Miami, Florida, USA. The meeting will be held at the James L. Knight International Center in downtown Miami, with the theme of "Geographic and Conceptual Frontiers of Tropical Biology." The meeting will be co-sponsored by the University of Miami and Florida International University, along with other members of the Center for Excellence in Tropical Biology. The deadline for symposium proposals is 15 October 2003. For more information as it becomes available, visit the ATBC Meetings webpage at <<http://www.atbio.org/meetings.html>> or contact the two Program Directors: Theodore H. Fleming, Department of Biology, University of Miami, Coral Gables, FL 33124, USA, Tel.: 305-284-6881, Fax: 305-284-3039, email: <tfleming@fig.cox.miami.edu>, or David Lee, Department of Biological Sciences, Florida International University, University Park, Miami, FL 33199, USA, Tel.: 305-348-3111, Fax: 305-348-1986, email: <leed@fiu.edu>.

VI International Conference on Wildlife Management in Amazonia and Latin America, 5-10 September, 2004, Iquitos, Peru. Organized by The National University of the Peruvian Amazon (UNAP), the Durrell Institute of Conservation and Ecology (DICE) and the Wildlife Conservation Society (WCS). The organizers cordially welcome and invite the participation of a wide audience including students, professionals, local communities, NGOs, government representatives and the general public. Special emphasis during this conference will be on lessons learnt in wildlife conservation and management in Amazonia and Latin America. Discussions and presentations will look at the advances made for conservation, and the lessons learnt in the design, development, implementation, methods, and management plans for wildlife in Amazonia and Latin America. If you are interested in receiving further information about the conference; submission of abstracts, workshops, and courses; and information on registration and hotels, please visit the conference

website at <<http://www.vicongreso.com.pe/>>. If you have any questions, contact the conference organisers by e-mail at <congresofauna@amauta.rcp.net.pe>. The Organizing Committee includes Dr Richard Bodmer-DICE, Dr Lorgio Verdi-UNAP, Pablo Puertas-WCS.

2005

19th Annual Meeting of the Society for Conservation Biology, Está previsto para acontecer em julho de 2005, na Universidade de Brasília (UnB). A Diretoria da Society for Conservation Biology (SCB) escolheu Brasília como sede do congresso no dia 2 de julho último durante a 17ª reunião que foi realizada em Duluth, MN, EUA. A organização geral estará a cargo do Prof. Miguel Ângelo Marini do Departamento de Zoologia da UnB. Participarão da comissão organizadora, professores do Departamento de Zoologia da UnB, membros da diretoria da Seção da América Austral e Neotropical (ANA) da SCB, e outros pesquisadores principalmente do Brasil e de outros países Latino-americanos. A data exata da realização do congresso será definida nos próximos meses. Informações detalhadas do congresso só estarão disponíveis na Internet em 2004.

Association of Tropical Biology and Conservation 2005 Annual Meeting, 23-29 July 2005, Uberlândia, Brazil. The venue is the Center Convention Uberlandia. For more information write to the Chair of the Organizing Committee, Kleber del-Claro, Laboratório de Ecologia Comportamental e Interações, Universidade Federal de Uberlândia, Caixa Postal 593, 38400-902 Uberlândia, Minas Gerais, Brazil, or email to <delclaro@ufu.br> or <atbc2005@inbio.ufu.br>.

29th International Ethological Conference, 20-27 August, 2005. Budapest, Hungary. Hosted by the Hungarian Ethological Society at the Eötvös University (ELTE) Convention Centre. For more information, write to IEC2005, Department of Ethology, Eötvös University, 1117 Budapest, Hungary, or join the e-mail newsletter: <IEC2005-subscribe@yahoogroups.com>.

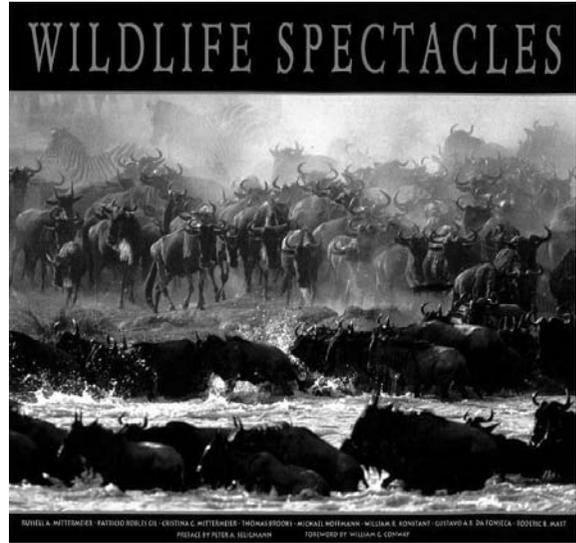
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