

# Edentata

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# *Edentata*

## The Newsletter of the IUCN/SSC Edentate Specialist Group

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## EDITORIAL

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### **The Conservation of Xenarthra Will Be Vital for the Preservation of Mammalian Phylogenetic Diversity**

Mammalian standing diversity may reach 5,000 species, currently divided into 26 orders, 135 families and 1135 genera. The edentates (Xenarthra) contribute with a meager 29 species. The 2000 IUCN Red List of Threatened Animals has eight species of edentates classified in one of its categories, out of a total of 1,130 mammals, not a single (fortunately) yet considered critically endangered. This might lead one to believe that the fate of sloths, armadillos and anteaters represents a negligible portion of the challenge of preserving mammalian evolutionary diversity (compare this with the 223 primate taxa considered threatened, 51 of which Critically Endangered!).

However, recent molecular evidence (Madsen *et al.*, 2001; Murphy *et al.*, 2001) strongly supports the long-suspected notion of Xenarthra being an ancient, basal group within the placental mammals, and one of its only four extant superordinal clades, with origins being traced back to Gondwanaland. What such results suggest is that the four families of living edentates retain a disproportional amount of the evolutionary history of placental mammals, immediately making the plight of these 29 species a great priority for conservation. Unfortunately, as a group, edentates are very poorly studied when compared with other mammals, in particular regarding their conservation status in the field. Most species are notoriously difficult to investigate in the wild, which presumably drives away potential students.

Hoping to stimulate additional work focusing on sloths, armadillos and anteaters, particularly those suspected to be threatened by habitat destruction and hunting, the Edentate Specialist Group has created an Action Fund to support studies that will help elucidate their status in the wild. The fund is being financed by Conservation International's Center for Applied Biodiversity Science. We will hope to make the turn-around time for the funding of proposals as fast as possible, and we especially invite students from developing countries of the western hemisphere, home of the edentates, to apply for funding. There is a more detailed description of this opportunity in this issue of *Edentata*.

*Gustavo Fonseca*  
*Chair*  
*Edentate Specialist Group*

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## ARTICLES

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### Does the Endangered Xenarthran Fauna of Amazonia Include Remnant Ground Sloths?

David C. Oren

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In what was viewed by many as an extremely controversial paper (Oren, 1993), I proposed that stories linked to an Amazonian creature known locally as the *mapinguari* or *juma*, among other names, may be based on human contact with remnant ground sloths. In general, it is considered that all the ground sloths are extinct and that there are only two living genera of tree-sloths (*Choloepus* and *Bradypus*), highly adapted to an arboreal lifestyle. I myself was among those sharing this general viewpoint, until I met Amazonians who told me about supposed face-to-face encounters with an animal that is best interpreted as a living remnant ground sloth. Seven claimed to have actually killed specimens. Even if there is only a small possibility that these stories are based on fact, it seems worthwhile from a conservation point of view to entertain, at least for the sake of argument, the possibility that there is an additional form of endangered xenarthran, however unlikely, in the forests of Amazonia. I further argue that such a remanescent form is really not all that unexpected.

The living and extinct sloths are generally divided into four or five families (some authors merge Mylodontidae and Scelidotheridae) (see McKenna and Bell 1997). My article was not the first time that someone had proposed that there might still be ground sloths alive in South America. More than 100 years ago, Argentine paleontologist Florentino Ameghino created a great international stir by proposing that mylodontid ground sloths were still extant in Patagonia (Ameghino 1898, 1899). He had two lines of evidence. First, his

friend Ramón Lista, an Argentine geographer and government official, reported sighting a strange quadruped in Santa Cruz, southern Patagonia. He said that it was pangolin-like but hairy. Lista said that he and his companions shot at the animal but that it escaped into the vegetation, apparently unscathed. Later Ameghino examined what to him appeared to be a piece of fresh ground sloth skin, which we now know originated from a mummified mylodontid discovered in a cave at Ultima Esperanza Bay in Chile. Based on the skin fragment, Ameghino then described *Neomylodon listae* in honor of his friend. Radio-carbon and stratigraphic evidence gives ages ranging from 5,000 to 13,000 years for the ground sloth remains from the Ultima Esperanza Bay cave, and 4,400 years for a sloth bone from northern Chile, but there is controversy about these dates, which are not universally accepted (Greenwell, 1996).

In the Caribbean there is a good possibility that relatively small megalonychid ground sloths and humans coexisted. The probably semi-arboreal *Synocnus* of Hispaniola is the best candidate for having overlapped with human occupation in the West Indies. Other megalonychid genera possibly co-occurring with paleo-Indians include *Acratocnus* of Cuba and Puerto Rico and *Parocnus* of Cuba and Hispaniola (McKenna and Bell, 1997).

Bernard Heuvelmans (1958), the consolidator of cryptozoology, retells the story of Ameghino and colleagues in his classic tome, and ends his fascinating chapter on ground sloths in Patagonia with the following on the possibility that there still might be ground sloths somewhere:

*"...the largest sloths would have retreated, as the jaguar did, to the tropical forests, where they could find a safer refuge. All the same, it is unlikely that the really gigantic species could have adapted themselves to the inextricable virgin forests, the habitat in which the small tree species flourished. If such is the case, what has happened to them in their impenetrable retreat in the vast Amazonian selva and the boscosa of the Andes? It is hard to see what, in the peace of these forests rarely inhabited by man, could have led*

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to their extinction. *Might they not still live in this “green hell” and find it a heaven of peace?”*

Curiously enough, Heuvelmans’ next chapter is precisely on would-be unknown species of the Amazon, but there is no further mention of ground sloths. In this chapter, he attributes all stories of *mappinguaris* and similar creatures to undescribed primates.

Ever since I first arrived in the Brazilian Amazon in 1977, I heard tales of all sorts of mythical creatures in the rainforest. There is the *curupira*, a small, childlike imp that has its feet turned backwards and rides on the backs of white-lipped pecararies. Forest dwellers who overhunt are certain to be enchanted by the *curupira*, who will get them hopelessly lost in the *selva*. The *mãe-de-seringa* is the protector of the rubber trees, and those who tap latex in a form that is harmful to the trees will be attacked by this vampire-like woman, who kills her victims.

From my first field work in the Tapajós River basin, I heard stories of the *mappinguari*, a fearsome, powerful, hairy, stinking behemoth with a blood-curdling roar and human-like proportions. Surely this creature also was part of the panoply of mythical animals that the natives love to talk about. But the more I traveled to other basins, the more stories I heard, until finally in 1988 I heard an account that I could not dismiss as a fictional tale of a run-in with a myth. Clearly my interlocutor was not lying about what he claimed to have seen in the forests of what today is northern Tocantins State. After listening carefully to the story, a light went on in my brain: “This creature

could only be a ground sloth!” Then a more cautionary tone took over: “Wait a minute, you’ll be taken for a wacko!”

When I wrote the 1993 paper, I had never interviewed anyone who had claimed to have killed one of these supposed animals. I now have testimony from seven hunters who say they killed these animals in the following municipalities in the Brazilian Amazon: Eirunepé (Amazonas), Marabá (Pará), region of the Parque Nacional da Serra do Divisor (Acre – two hunters), Juína (Mato Grosso), Manicoré (Amazonas), and Carauari (Amazonas). Supposed witnesses who say they simply came face to face with such an animal number over 80. What they describe: a creature approximately 2 m tall when standing upright; a very strong, unpleasant smell (most say that it’s just the worst odor they ever smelled, although others describe the stench as a mixture of feces with rotting flesh); extremely heavy and powerful build; capable of breaking thick roots with its footsteps; claws on the manus similar in size to *Priodontes maximus* (Giant Armadillo), but shaped like those of *Myrmecophaga tridactyla* (Giant Ant-eater or Tamandua); long coarse fur that is either reddish, blackish or brownish in color; a muzzle that looks like a burro’s or horse’s, though shorter; four large canine-like teeth; ability to locomote on all fours and bipedally, although the bipedal gait is not agile; footprints that are roundish (quadrupedal gait) or like people’s, but with only four toes (bipedal gait); and extremely loud, roaring vocalizations and/or vocalizations similar to a human calling loudly, but with a growl at the end. Six of the hunters claimed that they killed the animal with special slugs of solid lead in shotguns aimed at the head, and that normal shot aimed elsewhere has little effect on the animal. The seventh hunter emptied a 38 caliber revolver into the animal’s chest. Three hunters saved remains (samples of hair, claws or a manus), which were later discarded, while the others saved nothing. They stated that they did not save remains principally due to the insupportable odor the animal emitted, which left them light-headed and nauseous.

Family	Representatives
Mylodontidae	Extinct Ground Sloths, North and South America
Scelidotheridae	Extinct Ground Sloths, South America
Megatheriidae	Extinct Ground Sloths, North, Central and South America
Megalonychidae	Extinct Ground Sloths, Choloepus (Two-toed Sloths), North, Central and South America, plus West Indies
Bradypodidae	Three-toed Sloths (Bradypus), Central and South America



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Although in the 1993 paper I proposed that if such an animal is a ground sloth then it probably belongs to the Mylodontidae, my suggestion now is that a megalonychid is a better candidate, based primarily on the four canine-like teeth and gait. Only megalonychids could have locomoted the way witnesses describe (as per Toledo, 1998).

I admit that not all the evidence is consistent with a ground sloth. The hunters claim that the animal had a short tail. In all cases for which we have reasonably complete material, the known fossil ground sloths had well-developed tails, important for stability when used to complete a “tripod” with the lower limbs to reach up to browse on foliage. Some researchers have suggested that the descriptions they have heard in the Amazon of such an animal are more consistent with a bear than a ground sloth (K. Campbell, pers. com., J. Patton, pers. comm.). In this context it is important to note that Shepard (in press), found that the Peruvian Matsigenka tribe describe an animal of which they are terrified, called *segamai*, very similar to the Brazilian Amazonian *mapinguari*. When asked if it is like a bear (they know Andean bears well), they expressed great surprise and affirmed that the two animals are completely different (Shepard, pers. comm.).

Castor Cartelle (pers. comm.) questions the loud vocalizations, since living sloths and other xenarthrans are largely mute. Although the modern xenarthrans pass most of their time quietly, they are indeed capable of making impressive sounds, such as the weeping-like vocalizations of *Bradypus* (pers. obs.), trumpet-like vocalizations produced by *Priodontes* (pers. obs.), and variety of sounds made by three tamanduas and an armadillo available on Emmons *et al*'s (1997) CD of Neotropical mammal sounds.

I am the first to confess that this adventure into cryptozoology is a dangerous one for a researcher concerned with maintaining his reputation as an authority on Amazonian biodiversity. At the same time, I believe that just coming forward with this hypothesis increases by several orders of magni-

tude the chances that if an animal of this sort is killed, at least part of it will make it into the hands of someone who recognizes its importance. And can one imagine the boon to conservation in tropical South America if such a spectacular new “flagship” species were to be found? At the very least there would be better funding for basic biological inventory work. This is not a search for dinosaurs, extinct tens of millions of years, but the possibility of a very rare, remnant representative of a fauna that flourished in the Americas, and particularly in Amazonia (Ranzi, 2000), until a few thousand years ago. The Chacoan Peccary was discovered still living only 27 years ago, Javan rhinos were recently rediscovered on the Asian mainland, and two new ungulates were recently described from war-torn Vietnam. In the vastness of the Amazon, the discovery of a large new mammal cannot be considered all that unlikely or improbable.

As a side note, Richard Cerutti (pers. comm.), paleontologist at the San Diego Natural History Museum, suggested to me that descriptions of the legendary “Bigfoot” or “Sasquatch” of the Pacific Northwest of the United States and Canada are much more consistent with a remnant ground sloth than with some undescribed great ape. There were plenty of ground sloths in that region until quite recently, and no great ape fossils have ever been found there. He did not by any means try to suggest that such an animal is still living, but rather that folklore tradition of the native peoples there has maintained the animal “alive,” even though it probably went extinct hundreds or even thousands of years ago. Is such the case with the *mapinguari*, alive in folklore but long gone in nature? If so, what did those seven hunters kill deep in the Amazon rainforest?

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## Armadillos del Noroeste Argentino (Provincias de Jujuy y Salta)

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### Abstract

Data on the presence of species, abundance and habitat association of armadillos from northwestern Argentina were collected during two field seasons in 1988. Four of the eight previously

cited species were recorded. Among them, *Tolypeutes matacus* showed a well-defined association with xeric habitats, *Dasyus yepesi* and *Euphractus sexcinctus* were present from the xeric lowland environments to humid mountain forests. *Chaetophractus vellerosus*, although typical in dry environments, was recorded in the same habitats as *D. yepesi* and *E. sexcinctus* but was very scarce.

### Introducción

Los estudios sobre la asociación de los armadillos con el ambiente que habitan son pocos y aislados y, si bien se cuenta con cierta cantidad de información acerca de sus distribuciones geográficas, poco es lo que se sabe respecto de sus exigencias ecológicas. En este sentido, el noroeste argentino es una región interesante pues en un área relativamente pequeña se da la conjunción de tres dominios biogeográficos representados por una gran variedad de hábitats y de zonas ecotoniales (Cabrera y Willink, 1973). Esta condición de variedad ambiental se halla determinada en gran parte por la topografía regional, con un relieve montañoso de pendientes pronunciadas que determina marcadas variaciones altitudinales de temperatura, presión, humedad y precipitaciones. Las lluvias dependen además de la orientación de las laderas con respecto a los vientos dominantes del este, de modo que las laderas orientales reciben fuertes lluvias estivales a medida que el viento gana altura y se enfría, mientras que las cumbres más altas y las laderas occidentales reciben vientos secos que han perdido su humedad durante el ascenso por el lado oriental.

Durante los meses de junio y noviembre de 1988 se realizaron trabajos de campo en la región, en los que se recorrió una extensa zona de los departamentos de Ledesma, Valle Grande y Santa Bárbara (Provincia de Jujuy) y Orán (Provincia de Salta), visitando numerosas localidades ubicadas a diferentes altitudes y en distintas unidades de hábitat. También, se efectuó una transecta de aproximadamente 150 kilómetros entre las localidades de Humahuaca (Departamento Humahuaca, Jujuy, 3000 msnm) y San Ramón de la Nueva Orán (Departamento de Orán, Salta, 500 msnm),

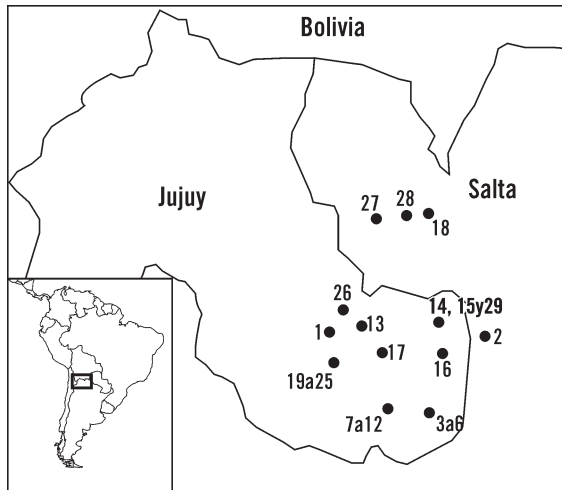


FIGURA 1. Localidades en el área de estudio. Ver numeración en Tabla 1.

atravesando la Serranía de Aparzo por el Abra Chisca (4000 msnm) y la Sierra de Zenta por el Abra de Zenta (4400 msnm), límite entre las dos provincias (Fig. 1). En la tabla 1 puede verse un listado de las localidades, su ubicación geográfica, altitud sobre el nivel del mar y las unidades de hábitat a la que representan.

Los armadillos constituyen una importante y tradicional fuente de proteínas en la dieta de los lugareños, quienes usualmente los capturan para su consumo. Es común que retengan las corazas, a las que les dan distintas utilidades, y partes del esqueleto, restos que permiten realizar la identificación específica con facilidad. La interacción con los habitantes de pueblos y caseríos permitió recuperar numerosos ejemplares, así como importante información sobre el ambiente del que proceden. Aquellos ejemplares que presentaron un estado de conservación aceptable fueron depositados en el Museo de La Plata.

### Caracterización de hábitats

Para la clasificación de los hábitats se sigue el criterio de Cabrera (1976), quien reconoce para la zona:

#### *Dominio Andino-Patagónico:*

a) Vegetación altoandina, por encima de los 3000 msnm, cuya comunidad clímax es la estepa de gramíneas como *Festuca orthophylla*, *Festuca*

*chrysophylla* y *Poa gymnantha*. El clima es frío todo el año y las precipitaciones se producen en forma de nieve o granizo.

#### *Dominio Chaqueño:*

b) Prepuna, por encima de los 1000 msnm. El clima es cálido y seco, con lluvias exclusivamente estivales. Predomina la vegetación arbustiva, baja y esparcida.

c) Bosque xerófilo chaqueño, caducifolio, con un estrato de gramíneas, cactáceas y bromeliáceas terrestres. Las lluvias ocurren entre noviembre y marzo y la temperatura media anual es de 20 a 23°C.

#### *Dominio Amazónico (Provincia de las Yungas)*

d) Bosque montano. Se desarrolla entre los 1200 hasta los 2500 msnm, su clima es algo frío y presenta nevadas en la estación húmeda. Predominan el pino (*Podocarpus parlatorei*), el aliso (*Alnus jorullensis*) y la queñoa (*Polylepis australis*).

e) Selva montana, en las laderas orientales de las montañas. Se desarrolla entre los 550 y 1600 msnm. Es casi impenetrable por su densidad, con árboles que superan los 30 m de altura. Entre los meses de diciembre y mayo se halla constantemente cubierta por las nubes.

f) Selva de transición. Entre los 350 y 500 msnm, esta selva se desarrolla en las zonas llanas y montañas bajas, con árboles de entre 20 y 30 m de altura y un estrato arbustivo de cerca de 2 m. La precipitación es de entre 700 y 1000 mm anuales.

### Resultados

#### *Tolypeutes matacus* “Quirquincho bola”

Esta especie es típica de la región chaqueña desde el sudeste de Bolivia y sur de Mato Grosso en Brasil, hasta el noroeste de la Provincia de Buenos Aires en Argentina (Wetzel, 1982). En la zona estudiada se registraron 18 ejemplares, exclusivamente en ambientes de bosque xerófilo (localidades 1, 2, 3, 4, 7 y 11, un ejemplar en cada una; localidad 5, tres ejemplares; localidad 6, dos ejemplares y localidad 13, cuatro ejemplares) o ecotono bosque xerófilo/selva de transición (localidades 14, un ejemplar y 16, dos ejemplares) siempre con menos de 700 mm de precipitación anual.



### *Chaetophractus vellerosus* “Piche llorón”

La distribución de esta especie incluye centro y sur de Bolivia, oeste de Paraguay y norte y centro-oeste de Argentina (Wetzel, 1982), en ambientes áridos y semiáridos con suelos arenosos y vegetación xerófila (Carlini y Vizcaino, 1987). Solamente cuatro ejemplares fueron colectados por

nosotros. Dos de ellos en bosque xerófilo (localidad 5), uno en selva de transición (localidad 17) y el restante en selva montana (localidad 24).

### *Euphractus sexcinctus* “gualacate o gualincho”

La distribución de esta especie comprende según Wetzel (1982) las savanas al sur de Surinam y las adyacentes de Pará (Perú), el Mato Grosso y las tierras altas de Brasil, Uruguay, Paraguay, norte de Argentina y Sud-este de Bolivia. Se reunieron ocho ejemplares, provenientes del bosque xerófilo (localidades 2,3,5,9 y 13, un ejemplar por localidad), la selva de transición (localidad 17, un ejemplar) y la selva montana (localidades 19 y 25, un ejemplar en cada una).

### *Dasypris yepesi* “mulita”

Esta especie fue reconocida por Vizcaino (1995) e incluye especímenes previamente asignados a *D. mazzai* (Yepes, 1933; Cabrera, 1957; Olrog, 1976, 1979), *D. hybridus*, *D. septemcinctus* y *D. novemcinctus* (Wetzel y Mondolfi, 1979). Su distribución está sólo confirmada para la región considerada en este trabajo. Se registraron 18 ejemplares, de los cuales 6 correspondieron al bosque xerófilo (localidad 11, cinco ejemplares; y localidad 12, un ejemplar), dos al ecotono bosque xerófilo/selva de transición (localidades 14 y 15), seis a la selva de transición (cinco ejemplares en la localidad 17 y uno en la 19), y los cinco restantes a la selva montana (localidades 19, 22 y 23, un ejemplar en cada una y localidad 28, dos ejemplares).

### Discusión

Otras especies mencionadas para la región no fueron registradas. *Chaetophractus nationi* fue citada para la puna argentina por Cabrera (1957). Wetzel (1985) desestima la presencia en la región de esta especie, a la que considera como una probable subespecie de *C. vellerosus*. Estas especies no fueron obtenidas por nosotros en las zonas de vegetación altoandina en las que teóricamente habitarían, probablemente debido a su baja densidad y a que no existen asentamientos humanos estables que puedan proveer material o información sobre los armadillos de ese hábitat. Tampoco se encontraron *D. hybridus*, *D. septemcinctus* y

TABLA 1. Sinopsis de la ubicación geográfica, altitud y ambientes de las localidades de muestreo.

Ref.	Localidad	Altitud msnm	Ubicación (Dto; Provincia)	Hábitat
1	La Estrella	600	Salta; Salta	Bx
2	Arroyo Punta de Agua	640	Sta. Bárbara; Jujuy	Bx
3	Islas Chicas	720	Sta. Bárbara; Jujuy	Bx
4	Real de los Toros	770	Sta. Bárbara; Jujuy	Bx
5	Islas Grandes	620	Sta. Bárbara; Jujuy	Bx
6	Puesto Nuevo	620	Sta. Bárbara; Jujuy	Bx
7	La Quinta	660	Sta. Bárbara; Jujuy	Bx
8	Laguna San Miguel I	600	Sta. Bárbara; Jujuy	Bx
9	Laguna San miguel II	600	Sta. Bárbara; Jujuy	Bx
10	Laguna San Miguel III	600	Sta. Bárbara; Jujuy	Bx
11	El Palmar	600	Sta. Bárbara; Jujuy	Bx
12	San Andrés	1800	Orán; Salta	Bx
13	Arroyo Saladillo	770	Ledesma; Jujuy	Bx
14	Finca “La Mauricia” I	500	Ledesma; Jujuy	Bx/St
15	Finca “La Mauricia” II	500	Ledesma; Jujuy	Bx/St
16	Lapachal	640	Sta. Bárbara; Jujuy	Bx/St
17	Finca “La Realidad”	440	Ledesma; Jujuy	St
18	El Oculito	700	Orán; Salta	St
19	El Caulario I	940	Ledesma; Jujuy	Sm
20	El Caulario II	940	Ledesma; Jujuy	Sm
21	Los Sauces	1300	Ledesma; Jujuy	Sm
22	El Alto	1200	Ledesma; Jujuy	Sm
23	Normenta I	1090	Ledesma; Jujuy	Sm
24	Normenta II	1090	Ledesma; Jujuy	Sm
25	Arrayanal	1020	Ledesma; Jujuy	Sm
26	Rio Jordán	1500	Ledesma; Jujuy	Sm
27	Las Maromas	1100	Orán; Salta	Sm
28	Rio San Andrés	800	Orán; Salta	Sm
29	San Francisco	1560	Ledesma; Jujuy	Bm/Bx

*D. novemcinctus*. Sin embargo, ejemplares de *D. novemcinctus* procedentes de Tabacal (Dto. de Orán, Salta) depositados en el Museo Argentino de Ciencias Naturales, señalan la posibilidad de la presencia de esta especie en el área considerada, fundamentalmente en el bosque xerófilo y su ecotono con la selva de transición.

De las 4 especies encontradas, *T. matacus* es la que muestra más claramente una asociación con un hábitat en particular. Sólo se lo registró en ambientes secos con vegetación de tipo xerófilo, en los que representa el 53.5% de los armadillos capturados por los habitantes de esas zonas, desapareciendo abruptamente en áreas de más de 700 mm de precipitación anual. Esta correlación estrecha es concordante con el tipo de ambiente dominante en su área de distribución. Si bien se registraron tantas mulitas como quirquinchos, su patrón de aparición está bien diferenciado. *D. yepesi* apareció desde las zonas bajas y secas correspondientes al bosque xerófilo hasta los ambientes montañosos, húmedos y selváticos de la selva montana, de manera que aparenta tener una amplia tolerancia en cuanto a sus requerimientos ambientales. *E. sexcinctus* fue hallada en los mismos hábitats que *D. yepesi*, aunque con menor frecuencia.

No es posible inferir la relación entre *C. vellerosus* y su hábitat a partir de los datos obtenidos debido al limitado número de ejemplares de que se dispuso. Sin embargo, dado lo que se conoce de la distribución y la biología de esta especie, su presencia estable en la selva montana resulta dudosa, aunque no podría descartarse su ingreso por los valles de los grandes ríos como ocurre con numerosos elementos florísticos de origen chaqueño en el valle del Río San Francisco (Brown y Ramadori, 1988).

Debido a que todos los armadillos son igualmente apreciados por los pobladores, quienes no señalan una selectividad específica al momento de cazarlos, podría interpretarse que *E. sexcinctus* y *C. vellerosus* son las especies menos abundantes de las cuatro halladas.

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## Tatú carreta (*Priodontes maximus*) en Argentina

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## Introducción

El tatú carreta (*Priodontes maximus*) se encuentra en la Argentina en grave situación de peligro de extinción - amenazada a nivel nacional e internacional (Comité *ad hoc* SAREM, 1996, FUCEMA *et al.*, 1997, CITES Apéndice I) y en peligro (UICN, 1996). En la actualidad, los únicos registros de la existencia de ejemplares de tatú carreta (*Priodontes maximus*) son obtenidos a través de las capturas realizadas por pobladores locales en el área de distribución de la especie. Si bien no se han realizado estudios para confirmarlo, la aparición de ejemplares de tatú carreta se debería fundamentalmente a la expansión de la frontera agropecuaria y al uso intensivo del ambiente por parte de la población local. Cuando se encuentran animales vivos, éstos están siendo utilizados como mascotas en el ámbito local o capturados con la intención de venderlos y obtener algún beneficio económico. En cambio, cuando se encuentran los caparzones, generalmente se trata de ejemplares que fueron utilizados como alimento o ser exhibido los mismos como trofeo. En este contexto de falta de protección efectiva (a pesar de existir leyes que protegen a la especie. Varios ejemplares vivos fueron localizados, dos ejemplares fueron libera-

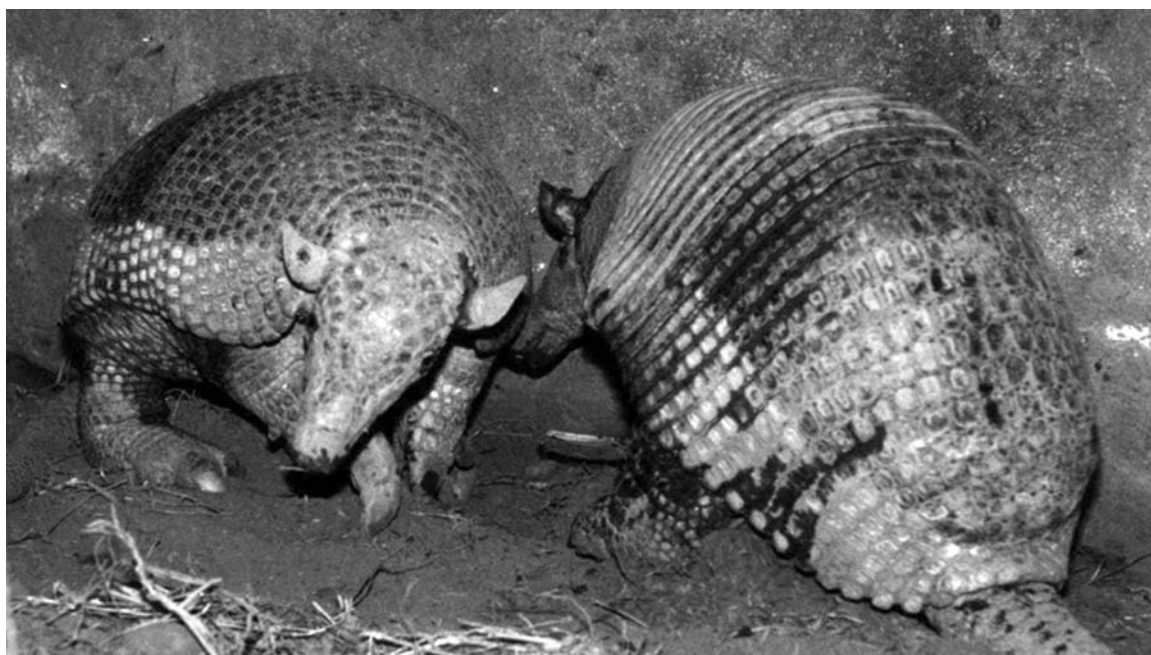


FIGURE 1. *Priodontes maximus*.

dos a su ambiente natural y varios caparazones fueron hallados.

### Nuevos Registros

No existen registros sistematizados y publicados de la especie acerca de su situación reciente, es por ello que la presencia de indicios y datos actuales tiene una gran importancia para su protección. En el transcurso de dos años se registraron dos ejemplares muertos en la provincia de Formosa y otros tres en la provincia de Chaco, mientras que se capturaron 3 ejemplares vivos (uno de ellos ya liberado).

El primer ejemplar fue capturado por pobladores rurales de la localidad de Frentones (Chaco) y llevado el 23 de marzo de 1999 al Complejo Ecológico de Roque Saenz Peña por personal del mismo. Este ejemplar pasó varios días en cautiverio y según información recabada en el lugar, se escapó de dos viviendas hasta su recaptura final. Por este motivo presentaba lesiones (principalmente en su caparazón) y un bajo peso corporal como consecuencia de una alimentación inadecuada. Trasladado al complejo mencionado, el ejemplar se recuperó favorablemente. Se trata

de un macho de 154 cm de longitud total y 28 kg de peso al momento de la captura (García J., 1999). Presumiblemente, el ejemplar había sido capturado para su posterior venta.

El segundo ejemplar fue capturado en las cercanías de la localidad de Campo Gallo (provincia de Santiago del Estero), según información que me fuera suministrada personalmente. Se realizó una visita al lugar de tenencia del animal. La familia que lo mantenía en cautiverio pretendía retenerlo como mascota en su vivienda. Luego de algunas conversaciones con ellos, durante las cuales se les explicó la problemática del tatu carreta, se efectuó el traslado del ejemplar al Complejo Ecológico Municipal de Sáenz Peña para su recuperación. Este ejemplar es una hembra de menor tamaño y con un buen estado sanitario. No presentaba lesiones externas de gravedad y en cuanto al estado general, sólo presentaba una disminución de peso debida al cautiverio de aproximadamente 15 días.

Ambos ejemplares están actualmente en recuperación en el Complejo Ecológico de Roque Saenz Peña (Provincia de Chaco) (ver foto).



FIGURE 2: Referencias Tatu Carreta (*Priodontes maximus*).

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El tercer ejemplar, una hembra hallada el 3 de agosto de 1999, por los dueños del predio, en la zona de “La Pirámide” (límite entre las provincias de Santiago del Estero y Chaco), fue trasladado al Zoológico de Roque Saenz Peña por personal de la provincia. Después de 26 días, muere, como consecuencia de las condiciones en las que ingresó (García J., com. pers.).

El primer caso de liberación se trató de un ejemplar de la especie producto de un decomiso realizado por organismos nacionales y provinciales de fauna y organizaciones no gubernamentales. Involucró a un ejemplar macho que se estaba ofreciendo para su venta. El ejemplar fue incautado y luego liberado en los primeros días del mes de mayo de 1993 en la Reserva Provincial Copo (hoy Parque Nacional). Según información de los trabajadores rurales, este ejemplar se encuentra en la zona, con patrones de desplazamientos coincidentes con los descritos por Carter, (1983).

El segundo caso consiste en un ejemplar hallado en un tanque australiano abandonado en la zona rural de la localidad de Río Muerto (Provincia del Chaco). Una vez dada la noticia de su aparición por el dueño del campo, el ejemplar fue trasladado, primero al Centro Ecológico Municipal de Roque Saenz Peña y dos días después fue liberado (en los primeros días del mes de octubre de 1998) en el Parque Provincial Pampa del Indio. No se realizan registros continuos de este ejemplar. Se han visto indicios de su presencia en la Reserva, se han observado también fuera de ella, por lo que se cree que utiliza áreas adyacentes a la zona de reserva (guarda parques, com. pers.).

Ambos casos de liberación de ejemplares podría considerarse como una reconstitución de poblaciones según la definición de la UICN (1987).

En la provincia de Formosa, en el mes de febrero de 1999, la Gendarmería Nacional decomiso 2 caparazones de Tatu carreta en la zona de San Martín 2 en Colonia San Pablo (Comunicación de Gendarmería Nacional). En Pozo El Mortero,

en el mes de octubre de 1998 se encontró un caparazón de un ejemplar cazado para consumo y fueron avistados allí 2 ejemplares en el mes de febrero de 1999. (Orozco J., com. pers.).

En la provincia de Chaco, en enero de 1999, en la zona cercana a la reserva de Pampa del Indio, se ha encontrado un caparazón de la especie producto de una captura realizada por un poblador de la zona para consumir su carne. A través de señas particulares del ejemplar liberado se sabe que el caparazón no pertenece al mismo y que por lo tanto se trataría de otro ejemplar capturado (García J., com. pers.). En la misma provincia, en el puesto “El Carmen” (abril de 1997) y las cercanías del puesto “Brasil” (fines de 1998), se registraron dos ejemplares muertos para consumo. Actualmente, en el primer puesto, el mismo cazador manifiesta haber visto indicios de un ejemplar. Personalmente registré en el mes de septiembre de 1999, cuevas recientes en la zona de “La Pirámide” en terrenos de propiedad privada.

#### **Situación Actual y Acciones Recomendadas**

La supervivencia de los ejemplares silvestres y liberados depende de: a) Eliminar la presión de caza sobre la especie; b) La conservación del hábitat.

#### *Presión de Caza*

La presión de caza sobre la especie se origina en factores internos de la comunidad local y en factores externos. Entre los primeros, cabe mencionar la caza de la especie para consumo de su carne. Razones culturales, la escasa capacidad económica de los pobladores locales constituyen un estímulo para buscar nuevas fuentes de proteína animal alternativa a las del ganado. No hay una caza focalizada para consumo de su carne. Los ejemplares son cazados durante eventualmente durante las recorridas en el monte. Otro factor interno es el sentido de “status” que confiere al cazador exhibir un tatu carreta. Ese hecho simboliza y lo acredita al cazador con experiencia y baqueano en el lugar. El principal factor externo es la difundida y exagerada idea que los ejemplares de esta especie tiene un alto valor en el mercado ilegal. Por



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lo tanto, solamente, una parte de la población es susceptible de verse involucrado en las capturas de esta especie. Por lo tanto, es necesario poner en marcha un plan de concientización local con el fin de evitar nuevas capturas. Para ello se realizarán recorridos por la zona y se repartirán folletos explicativos y un video a las escuelas de la comunidad. Se trabajará con la población cercana a las reservas de Pampa del Indio y Copo y en las zonas con registros recientes. Gradualmente, se extenderán las tareas de concientización a toda el área de distribución de la especie, con el fin disminuir la presión de caza por parte de los pobladores locales. Es importante explicar la situación crítica de la especie y poner en relieve el carácter ilegal de la actividad y exacerbar el sentido de pertenencia de la población respecto de esta especie.

#### *Conservación de hábitats*

La conservación del hábitat esta íntimamente relacionado con la tenencia de la tierra. Actualmente el régimen de tenencia de la tierra en el área de distribución de la especie pueden sintetizarse en las siguientes formas: 1) Reservas o Parques: de jurisdicción nacional o provincial; 2) Áreas privadas; Áreas fiscales con puestos (con terrenos privados intercalados).

En el área de distribución de la especie se encuentran las siguientes áreas de reserva:

*Parque Provincial Pampa del Indio* (Provincia de Chaco) posee escasas 8.633 ha. Es de jurisdicción provincial y cuenta con un agente de mantenimiento y vigilancia.

*Parque Nacional Copo* (Provincia de Santiago del Estero) tiene una superficie de 114.250 ha. Este Parque Nacional no posee guarda parques. Dentro de su territorio existen tres puesteros que desarrollan actividades agropecuarias. Debido a la falta de personal de vigilancia, esta reserva funciona como tierra fiscal en estos momentos. Se prevé que la situación cambie en el corto plazo.

*Reserva de Loros Habladores* (Provincia de Chaco). Esta Reserva de reciente creación sin relevamiento

aún, compuesta por 17.500 ha, ha sido creada por convenios entre organismos nacionales y provinciales, con jurisdicción provincial. Actualmente no posee personal permanente. Se prevé la incorporación de vigilancia y relevamiento de la zona en un plazo de 1 año (R. Banchs, com. pers.).

*Reserva Natural Formosa* (Provincia de Formosa) de 10.000 ha. de jurisdicción de Parques Nacionales y con un grado de protección insuficiente.

*Parque Nacional Chaco* (Provincia de Chaco) de 15.000 ha de jurisdicción de Parques Nacionales y un grado de protección aceptable. En estos dos parques se tiene referencia histórica de presencia de ejemplares (Heinonen Fortabat S. y chebez., 1997) pero no hay registros recientes.

*Reserva Teuquito* (Provincia de Formosa) de jurisdicción provincial, esta comprendida por 14.960 ha. sin protección efectiva.

#### **Áreas Privadas**

Las áreas privadas presentan un aprovechamiento intensivo del suelo a través de la producción agropecuaria. Esta se realiza con desmontes previos y posterior siembra. Es en éste nivel socioeconómico donde los cambios de hábitat se producen más rápidamente, dado el poder de inversión de sus propietarios. Las únicas áreas de conservación de hábitat surgen por inquietud privada a través de los denominados refugios. En estos, los propietarios se comprometen a conservar una parte del hábitat y donde la caza esta prohibida. Con extensiones que superan las 2.000 ha, pudiendo albergar ejemplares de la especie. Esta posibilidad implica plazos más cortos que las reservas ya que el futuro de las áreas depende básicamente del uso posterior que los dueños decidan. Sin embargo, representan una alternativa importante, debido a la posibilidad de expandir el área de protección de la especie y no circunscribirnos a las escasas áreas protegidas. En la zona de distribución no existen refugios privados.

## Áreas Fiscales Con Puestos

Existen zonas donde se intercalan puestos dentro de terrenos fiscales y privados (minifundios), de 200 a 2000 ha. Tanto en la provincia de Santiago del Estero como en la provincia del Chaco, la tendencia a la colonización de tierras fiscales responde a una política de gobierno. En este proceso los puesteros tienen posibilidades (no económicas) de ser propietarios de las tierras en las cuales habitan.

Si bien son áreas donde no hay fuertes inversiones productivas, el impacto inicial sobre el ambiente natural no es significativo, el proceso de degradación se va produciendo paulatinamente. Esto es debido a las necesidades de supervivencia del grupo familiar. Así, se produce la extracción selectiva de madera, de superficie generalmente muy inferior a la unidad ecológicamente sustentable.

Con el fin de obtener datos sobre el área de acción de la especie para la región chaqueña, teniendo como base los estudios realizados por Carter (1983). Se propone realizar estudios con radiotransmisores a los ejemplares localizados en su ambiente natural. Estos estudios permitirán conocer el tamaño e identificar las áreas prioritarias a proteger. Las experiencias realizadas con ejemplares en cautiverio no resultan alentadoras. La totalidad de los ejemplares mantenidos en cautiverio han muerto, la mayoría en un breve lapso y en ninguna oportunidad se obtuvieron crías en cautiverio.

Es por ello que actualmente esta en estudio la posibilidad realizar una reconstitución de los ejemplares actualmente en cautiverio. El ejemplar macho presenta lesiones en la patas traseras y la hembra posee una mansedumbre propia del cautiverio y su adaptabilidad.

## Conclusiones

En el marco de la situación descripta, los parques y reservas naturales, así como las inexistentes reservas privadas no permiten asegurar la protección de una población mínima viable para la especie. Las áreas son escasas, de reducido tamaño y sin conexión, que no permiten la existencia de corredores naturales.

Los registros actuales de la especie están ubicados en áreas cercanas a cambios recientes del ambiente. Es por ello que se debe comenzarse simultáneamente estudios en áreas de distribución central cuya información no presenta registros detallados y cuya existencia se tiene por referencias. La búsqueda de ejemplares en su ambiente natural esta enfocada en realizar acciones rápidas y concretas para la protección de la especie. De no ser así, en un futuro cercano, la especie estará en el listado de las especies extinguidas de Argentina.

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## The Tatujeikurajoyava (*Chlamyphorus retusus*) in the Izozog Communities of the Bolivian Gran Chaco

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The Gran Chaco is one of the largest biogeographic provinces in South America, covering one thirds of Paraguay, Argentina, Brazil, and Bolivia. The largest expanses of dry neotropical forest are found there, a region of great importance for its endemism of both plants and animals (Taber *et al.*, 1997; Redford *et al.*, 1990). The Bolivian Gran Chaco contains large tracts of the best conserved areas of the South American chaco biome (Taber *et al.*, 1997).

One of the endemic species of the dry chacoan ecosystem in Bolivia is *Chlamyphorus retusus*, locally known as “tatujeikurajoyava” or “culo tapado”. The biology, ecology and local distribution of this species is unknown (Anderson, 1997), and there are no current efforts to study or protect the species in Bolivia (Ergueta and de Morales, 1996).

The Izozog area, biogeographically situated in the Boreal Chaco Province (Navarro, 1997), lies



FIGURE 1: Tatujeikurajoyava, *Chlamyphorus retusus*.

300 km south-east of the city of Santa Cruz, Bolivia, between 19°50' S, 62°43'W and 19°10' S, 62°31'W. The altitude varies from 250 to 350 m above sea level. The mean annual rainfall is 550 mm and the mean annual temperature is 26°C. The wet season generally starts in December and ends in March or April (Navarro, 1997). The vegetation of the area is generally defined as chacoan xeric woodland with variants according to soil type (Taber *et al.*, 1997).

Since 1995, the Izoceño indigenous people, the largest group of subsistence hunters in the Bolivian Gran Chaco, have been implementing community wildlife management programs focused on game species in an effort to ensure sustainable exploitation. After ungulates, armadillos are the second most hunted group (Noss, 1998). From 1996 to 2000, local hunters reported hunting more than 2000 armadillos of the five species:

TABLE 1. Body measurements and weights of four specimens of *Chlamyphorus retusus*.

Sex	Head-Body Length mm	Tail mm	Hind-Foot mm	Ear mm	Weight g
Female	132	33	28	5	84.2
Female	125	35	30	5	63.5
Male	145	36	30	6	86.9 (without viscera)
Male	135	35	30	5	71.0



FIGURE 2: Tatujeikurajoyava, *Chlamyphorus retusus*.

*Dasybus novemcinctus*, *ChaetophRACTUS villosus*, *ChaetophRACTUS vellerosus*, *Tolypeutes matacus*, and *Euphractus sexcinctus*. During the same 4-year period, only eight individuals of *Chlamyphorus retusus* were reported (six were killed by local people and two were found by biologists). *C. retusus* is not hunted for food but is killed whenever encountered, not only by hunters but also by Izoceño women and children. This persecution results from the belief that *Chlamyphorus retusus* is an omen of bad luck, foretelling an impending death in the family. This belief is deeply rooted in adults and children alike.

The six individuals which were killed were donated by the hunters and provide a unique source of information about this rare species in the area. They had been killed in or around communities where the soil is compacted and surrounded by sand (i.e., communal football pitch, patios, or houses). The animals were adults, and the measurements taken were from four specimens after fixing in formalin at 10% and alcohol at 70% (Table 1).

Despite the fact that biologists have been working in or near the Izozog communities, for four years, only two individuals of *Chlamyphorus retusus* have been seen, measured, photographed and released (Miserendino and Saavedra, pers. comm.). One of these was observed in the permanent research camp, 30 km away from the Izoceño communities. It appeared in the camp at 22:00 hrs, scuttling and sniffing its way along the ground, occasionally making quick, shallow excavations in search of

food. The individual responded to the approach of the observers by burying itself half way into the ground. It was a bright pink and had strong claws, and appeared to be in good health. The individual was a female with the following measurements: HB 135, T 35, HF 30, Ear 0.4, Wt 90 g.

*C. retusus* is considered a rare species even among local people, probably due to its fossorial habits and low population. It is mostly confined to the more xeric portions of Bolivia, however the holotype came from the city of Santa Cruz de la Sierra (Anderson, 1997). This suggests that the distribution of *C. retusus* possibly extends to the north of the distribution normally described (Eisenberg and Redford, 1999), although there are no recent records from the vicinity of the city. As is the case in other parts of its range (Mares *et al.*, 1989), the future of *C. retusus* is uncertain in the Izozog area of the Bolivian Chaco. With well-protected areas and considerable amounts of land (3.5 million ha), the Kaa-Iya National Park should ensure the conservation of this species in the Bolivian Gran Chaco.

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## The Disjunct Geographical Distribution of the Yellow Armadillo, *Euphractus sexcinctus* (Xenarthra, Dasypodidae)

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The geographic distribution of the yellow armadillo (*Euphractus sexcinctus*) appears to be disjunct. According to Wetzel (1985a, 1985b) and Redford and Wetzel (1985), the species occurs in north-eastern, middle-western, southeastern and southern Brazil, as well as adjacent areas of Bolivia, Paraguay, Uruguay and Argentina. There is, however, a small isolated occurrence in the frontier region between Brazil and Suriname, north from the Rio Amazonas. Wetzel (1985a, 1985b) and Redford and Wetzel (1985) omitted these localities, although they were briefly described by Wetzel (1985b) as "The Sipaliwini savanna and its continuation as the Paru savanna in adjacent Pará". Wetzel (1985b) emphasized the need for further surveys of the geographic distribution of *E. sexcinctus* in the region of the lower Rio Amazonas.

An examination of the mammal collection of the Museu Paraense Emílio Goeldi (MPEG), the Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ) and the Museu de Zoologia of the Universidade de São Paulo (MZUSP), and the results of a faunistic inventory recently conducted in the Brazilian state of Amapá, suggest that the

disjunct area may be even larger than previously thought. The specimens collected were deposited in the MPEG.

The new localities in this region are (Fig. 1): 1. Fazenda Itapuá, AP-156 road, municipality of Amapá, 02°05'N, 50°55'W (MPEG-26264); 2. Fazenda Teimoso, AP-156 road, municipality of Ferreira Gomes, 00°59'N, 51°11'W (MPEG-26262, 26263); 3. Porto Platon, 00°42'N, 51°57'W (MNRJ-23972); 4. Fazenda Parabrillo, municipality of Itaubal, 00°46'N, 50°54'W (MPEG-26265).

The first two localities are in Amazonian savanna type vegetation, grassland with few shrubs and low trees (*campo cerrado*). Porto Platon is located in a forested area, but the specimen label does not contain information on mesohabitat. The Fazenda Parabrillo is located in the contact zone between the *campo cerrado* and the *floresta de terra firme*, and the local physiognomy is of a disturbed "cerrado *sensu stricto*" (about 20 years ago), with a high density of trees and shrubs.

The geographic distribution of *E. sexcinctus* is being systematically surveyed in eastern Amazonia. The data presented here, together with the 27 new localities in Maranhão (Silva Júnior *et al.*, 2001), significantly reduce the size of the area separating the two parts of the known geographic distribution of this species.

Further surveys are planned in eastern Pará to determine if the separation is merely an artifact of sampling. If the geographic distribution for *E. sexcinctus* is continuous, it will also be necessary to determine if the species occurs in the primary forests of the lower Rio Amazonas or if it is restricted to the natural *campos cerrados* and *campinas* of Amapá, Marajó Archipelago and eastern Pará, and areas of degraded forest.

### Specimens examined

Specimens examined in the MPEG, MNRJ, and MZUSP for comparison: *Euphractus sexcinctus*. **Brazil: Amapá:** Fazenda Itapuá, Amapá



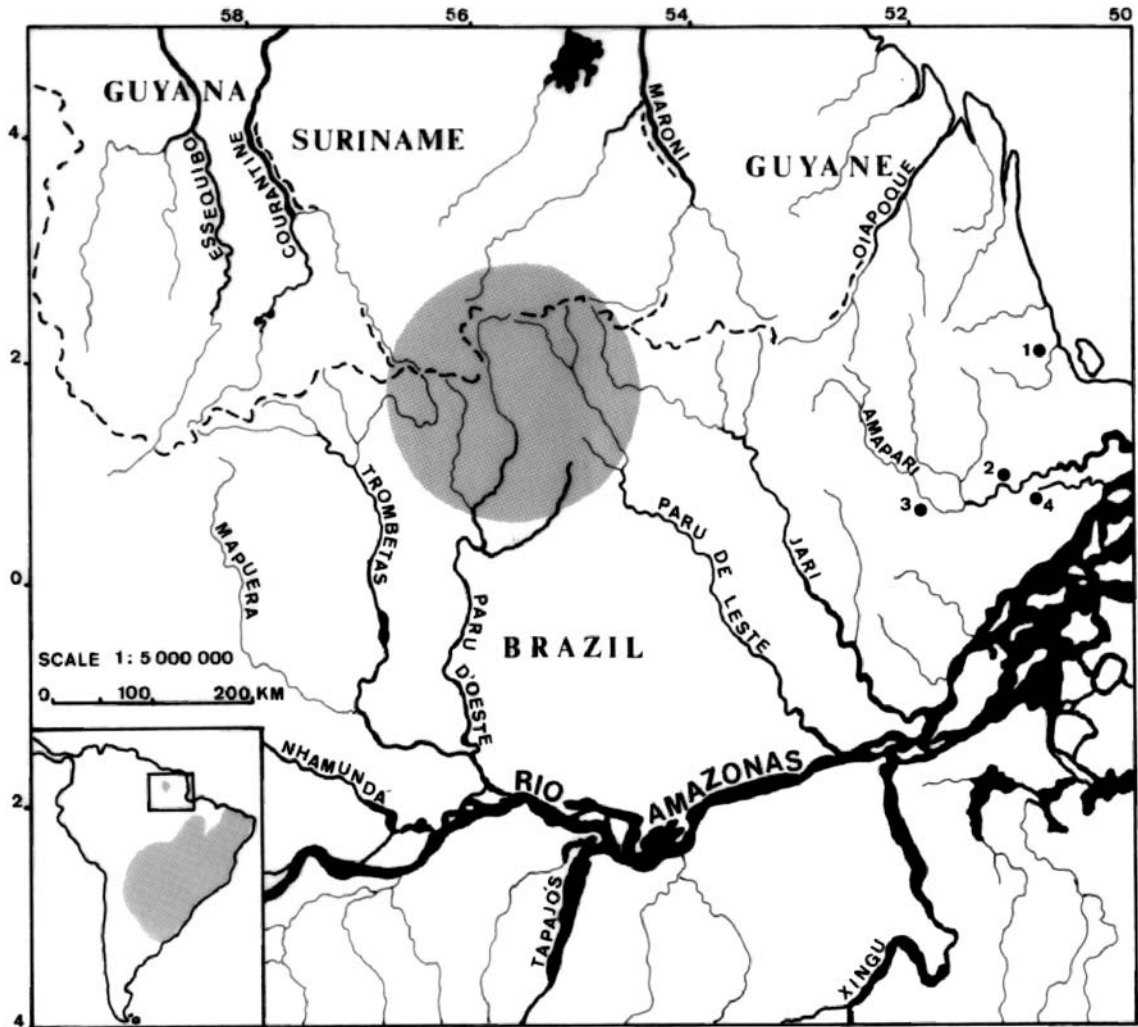


FIGURE 1. New records of *Euphractus sexcinctus* mapped on the geographic distribution (disjunct part) proposed by Wetzel (1985b) and Redford and Wetzel (1985): 1. Fazenda Itapuã, municipality of Amapá; 2. Fazenda Teimoso, municipality of Ferreira Gomes; 3. Porto Platon; 4. Fazenda Parabrillho, municipality of Itaúbal.

(AN-645=MPEG-26264); Fazenda Teimoso, Ferreira Gomes (AN-305, 306=MPEG-26262, 26263); Fazenda Parabrillho, Itaúbal (AN-765=MPEG-26265); Porto Platon (MNRJ-23972); **Pará:** Cachimbo, Formiga (MZUSP-8035); **Maranhão:** Barra do Corda (MZUSP-7989, 7990); Posto Indígena Awá, Reserva Indígena Caru (MPEG-22022); Boa Lembrança, Sítio Novo (MPEG-23160); Cocal dos Amâncio, Arame (MPEG-23162); Fazenda mapisa, Buriticupu (MPEG-26255, 26256); Alto Alegre, Bacabal (MPEG-26257, 26258); São José das Verdades, Bacabal (MPEG-26259); Piratininga, Rio

Piratininga, Bacabal (MPEG-23298); Palmeiral, Matões (MPEG-26260, 26261); Fazenda Varjão, Pé-de-Coco, Estreito (MPEG-23161); São Pedro dos Crentes, Estreito (MPEG-23163); Balsas, Rio Balsas (MPEG-23196, 23299); Ceará: Ipu (MPEG-590); **Rio Grande Do Norte:** Rio Grande do Norte (MPEG-22515, 22592); **Paraíba:** Paraíba (MNRJ-24130); **Pernambuco:** Rio Branco (MNRJ-1505); **Bahia:** Vitória da Conquista (MNRJ-26616); Bom Jesus da Lapa (MNRJ-4293, 4295); Senhor do Bonfim (MZUSP-2658, 3138); Santa Rita de Cássia, Ibipetuba (MZUSP-9973); **Tocantins:** Palma (MNRJ-2373, 2375); **Goiás:**

Anápolis (MNRJ-4529, 4530, 4531, 4540, 4543, 4732, 4973, 4976, 4977, 4979, 4980, 4986, 4988, 4990, 4991, 4992, 4993, 4994, 4995, 4996, 4997, 4998, 4999, 5000, 5001, 5002, 5003, 23980); Caldas Novas (MNRJ-24003); Mineiros (MNRJ-24475, 24476); Ponte do Ipê Arcado, near to Catalão (MZUSP-2158); **Mato Grosso:** Chapada (MZUSP-94); Rondonópolis (MNRJ-43803); Fazenda Aricá, Rio Aricá (MZUSP-6358, 6359); Dumbá (MZUSP-7030); Poconé (MZUSP-9971); Descalvado (MZUSP-25593); **Mato Grosso Do Sul:** Maracaju (MNRJ-4539, 4541, 4542, 4544, 4972, 4978, 4982); Corumbá (MZUSP-3891); Barra do Paredão, Rio Paraná (MZUSP-4561); Salobra (MZUSP-9972); Três Lagoas, Rio Sucuriú (MZUSP-19968); Fazenda Barma, Brasilândia (MZUSP-28770); **Minas Gerais:** Lagoa Santa (MNRJ-23994); Bambuí (MZUSP-8313, 17296, 17297); Araguari (MNRJ-24004); Lassance (MNRJ-43970); Mocambinho, Manga (MNRJ-28890); Fazenda Santa Idália, Matias Cardoso, Manga (MNRJ-29074); Ribeirão Bananal, Salinas (MNRJ-42849, 42851, 42852); Passos (MNRJ-10052, 10103, 10111); Fazenda Carrapicho, Passos (MNRJ-10047, 10048); São João do Glória, Passos (MNRJ-10057, 10058, 10101, 10105, 10108, 10110, 10113, 10115); Fazenda Bananal, Passos (MNRJ-10089); Fazenda Estiva, Passos (MNRJ-10098); Fazenda Cabuí, Mathias Barbosa (MNRJ-10060, 10069, 10083, 10104); Pirapora (MZUSP-3074); **Espírito Santo:** Santa Teresa (MNRJ-5886, 5887); **Rio De Janeiro:** Fazenda da Lapa, Mangaratiba (MNRJ-10112); Fazenda Três Barras, Bem Posta, Três Rios (MNRJ-10080, 10096); Fazenda da Lapa, São João Marcos (MNRJ-5645); **São Paulo:** Cajuru (MZUSP-6614); Serra de Botucatu (MZUSP-7697); Conchas (MZUSP-13735, 13799, 13802); Bauru (MZUSP-495); Fanca (MZUSP-1099); Itararé (MZUSP-1143); Avanhandava (MZUSP-2844); Itatinga (MZUSP-6490); Echaporã (MZUSP-18811); **Rio Grande do Sul:** Quinta, Rio Grande (MZUSP-22187); São Lourenço (MZUSP-341, 1005, 3892); **Bolívia:** Santa Cruz, Rio Pirahy, Prov. Cercado (MZUSP-5508).

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## New Records of the Yellow Armadillo (*Euphractus sexcinctus*) in the State of Maranhão, Brazil (Xenarthra, Dasypodidae)

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## Resumo

A borda noroeste da área de distribuição geográfica de *Euphractus sexcinctus* é revista com base em novos pontos empíricos determinados para o estado do Maranhão, Brasil. Os novos registros foram levantados através da coleta de espécimes, observações diretas, entrevistas, e espécimes de museus. A espécie foi detectada em 27 localidades inseridas em 4 biomas. Nós registramos o uso de uma grande variedade de mesohabitats

locais (alguns inéditos para o táxon). A área de distribuição geográfica é ampliada para englobar todo o Maranhão, estabelecendo-se um novo limite ao longo do rio Gurupí.

### Abstract

The northwestern limits of the geographic distribution of *Euphractus sexcinctus* were reviewed based on new localities from the state of Maranhão, Brazil. The new records include collected specimens, direct observations, interviews, and museum specimens. The species has been recorded in 27 localities, in four biomes. They appear to use a wide variety of local mesohabitats (some previously unknown for the taxon). The geographic distribution now encompasses all of Maranhão, establishing a new limit to the range along the Rio Gurupí.

### Introduction

The geographic distribution of the yellow armadillo (*Euphractus sexcinctus* Linnaeus, 1758) has to date been underestimated. Its range is poorly outlined, especially in the northwest, for which no localities for its occurrence have been published. Wetzel (1985a, 1985b) and Redford and Wetzel (1985) described a disjunct distribution for *E. sexcinctus*, stating that it appears to occur continuously throughout the north-east (east from the Rio Parnaíba), central-west, south-east and south of Brazil, as well as adjacent regions of Bolivia, Paraguay, Uruguay and Argentina; and in a small isolated area on the frontier region between Brazil and Suriname.

Wetzel (1985b) and Redford and Wetzel (1985) excluded eastern Amazonia from the distribution for *E. sexcinctus* due to a lack of records. The range was mapped using only known localities, a procedure which frequently generates problems in mapping accurate distributions (Cerqueira, 1995). However, Wetzel (1985b) emphasized the need for further research in the eastern Amazon basin. Recently, Emmons and Feer (1990, 1997) reproduced the Redford and Wetzel (1985) map without any alterations. Here we record new localities for *E. sexcinctus* in the state of Maranhão.

TABLE 1: New Localities for the occurrence of *Euphractus*.

Locality	Biome	References
P. I. Awá, R. I. Caru	Amazonia	MPEG-22022
Boa Lembrança	Amazonia	MPEG-23160
Cocal dos Amâncio	Amazonia	MPEG-23162
Buriticupu	Amazonia	MPEG-26255,26256
Alto Alegre	Zona dos Cocais	MPEG-26257,26258
S. José das Verdades	Zona dos Cocais	MPEG-26259
Piratininga	Zona dos Cocais	MPEG-23298
Palmeiral	Zona dos Cocais	MPEG-26260,26261
Barra do Corda	Cerrado	MZUSP-7989,7990
S. Pedro dos Crentes	Cerrado	MPEG-23163
Balsas	Cerrado	MPEG-23196,23299
Fazenda Varjão	Cerrado	MPEG-23161

### Material and Methods

The data were obtained from the mammal collections of the Museu Paraense Emílio Goeldi (MPEG) and Museu de Zoologia da Universidade de São Paulo (MZUSP), and from collections and observations in Maranhão ongoing since 1989 (Tables 1 and 2). The specimens collected were deposited in the MPEG (Table 1). The 27 new records were plotted on the Wetzel (1985b) map for identification of the points which he proposed (Figures 1-A and 1-B). The geographic coordinates below refer to the underlined localities, it was not always possible to obtain the exact coordinates from the collection and observation points:

01. Posto Indígena Awá, Reserva Indígena Caru, upper Rio Turiaçu (about 03°54'S, 46°35'W);
02. Boa Lembrança, municipality of Sítio Novo (05°52'S, 46°42'W);
03. Fazenda Varjão, Pé-de-Coco, municipality of Estreito (06°32'S, 47°27'W);
04. São Pedro dos Crentes, municipality of Estreito (about 06°14'S, 46°08'W);
05. Cocal dos Amâncio, municipality of Arame (04°42'S, 45°55'W);
06. near to Arame (04°42'S, 45°55'W);
07. near to Grajaú (05°49'S, 46°08'W);
08. Barra do Corda (05°30'S, 45°15'W);
09. mouth of the Rio Matão, right tributary of the Rio Balsas, municipality of Balsas (07°01'S, 46°56'W);
10. near to Balsas,

left bank of the Rio Balsas (07°31'S, 46°02'W); 11. Reserva Indígena Araribóia (about 04°57'S, 45°47'W); 12. near to Buriticupu (04°14'S, 46°32'W); 13. Lago dos Rodrigues, municipality of *Lago da Pedra* (04°19'S, 45°08'W); 14. near to Lago da Pedra (04°19'S, 45°08'W); 15. *Rio Estiva*, left tributary of the Rio Mearim, municipality of Bacabal (about 04°12'S, 44°47'W); 16. Rio Bambu, left tributary of the Rio Mearim, municipality of Bacabal (about 04°12'S, 44°50'W); 17. Alto Alegre, municipality of Bacabal (about 04°06'S, 44°57'W); 18. Fazenda Lagoa Nova, municipality of Bacabal (about 04°04'S, 44°58'W); 19. São José das Verdades, municipal-

ity of Bacabal (about 04°57'S, 44°28'W); 20. near to Lago Verde (04°04'S, 44°45'W); 21. Piratininga, left bank of the Rio Piratininga, right tributary of the Rio Mearim, municipality of Bacabal (04°12'S, 44°35'W); 22. Praia do Açúcar, right bank of the Rio Pindaré, municipality of Santa Inês (about 03°39'S, 45°22'W); 23. near to São Mateus (around 04°01'S, 44°27'W); 24. near to Arari (03°28'S, 44°47'W); 25. Palmeiral, municipality of Matões (about 03°40'S, 44°27'W); 26. Brejinho, municipality of Caxias (about 04°47'S, 42°50'W); 27. São Miguel, left bank of the Rio Parnaíba (opposite to União, Piauí), municipality of Caxias (04°39'S, 43°36'W).

TABLE 2: Field data on *Euphractus sexcinctus* in the state of Maranhão.

Locality	Biome	Mesohabitat	Observation Types
Palmeiral	ZC	3, 4, 5	col, cap, tri
Arari	ZC	2	cap, rel
São Mateus	ZC	2, 3, 4	cap, rel
Praia do Açúcar	AM/ZC	4	tri, rel
Alto Alegre	ZC	2, 3, 4	col, cap, tri, rel
Fazenda Lagoa Nova	ZC	1, 2, 4, 5	cap, tri, rel
São José das Verdades	ZC	3, 5	col, tri, rel
Lago Verde	ZC	2, 3, 4	rod, rel
Rio Bambu	ZC	2, 3, 4	cap, tri, rel
Rio Estiva	ZC	2, 3, 4	cap, tri, rod, rel
Piratininga	ZC	2, 3, 4	col, cap, rod, rel
Lago da Pedra	AM/ZC	5	Rod
Lago dos Rodrigues	AM/ZC	4	Rod
Buriticupu	AM	6	col, tri, rod
R. I. Araribóia	AM	6	Cap
Arame	AM	6	cap, rel
Grajaú	AM	6	Rod
Rio Matão	CE	8, 9	tri, rel
Balsas	CE	8	col, cap, rel
Brejinho	TR	7	Rel
São Miguel	TR	7	cap, rel

**Biomes:** AM= "Amazônia Maranhense"; ZC= "Zona dos Cocais"; CE= "Cerrado"; TR= transitional area from the eastern side of the State.

**Mesohabitat:** 1= old orchard near to secondary forest associated with "babaçal"; 2= "babaçal" associated with pasture; 3= "babaçal" associated with plantation; 4= "babaçal" associated with forest patches; 5= "babaçal" associated with secondary forest; 6= unflooded primary/secondary forest; 7= "cerradão"; 8= "cerrado" sensu stricto with gallery forest; 9= plantation continuous with "babaçal" and gallery forest.

**Type of observation:** col= collected; cap= captured live or dead for consumption tri= observations along trails; rod= observations along primary or secondary roads; rel= reports of local informants.



The information on habitat use was obtained through observations along trails, primary and secondary roads, live or dead animals captured for consumption, and from information from local people. Field identification was facilitated by the conspicuous phenotype of this species. The majority of information gathered from local people was used to confirm records and as additional data about mesohabitat use by *E. sexcinctus*.

### Results

Of the 27 localities listed, eleven were confirmed with museum specimens (Table 1). Table 2 lists the localities resulting from our field work, along with the biome, mesohabitat, and type of observation (collected, captured alive or dead for consumption, seen along trails or primary or secondary roads, and reported by local people). The large number of records and habitats for *E. sexcinctus* in the "Zona

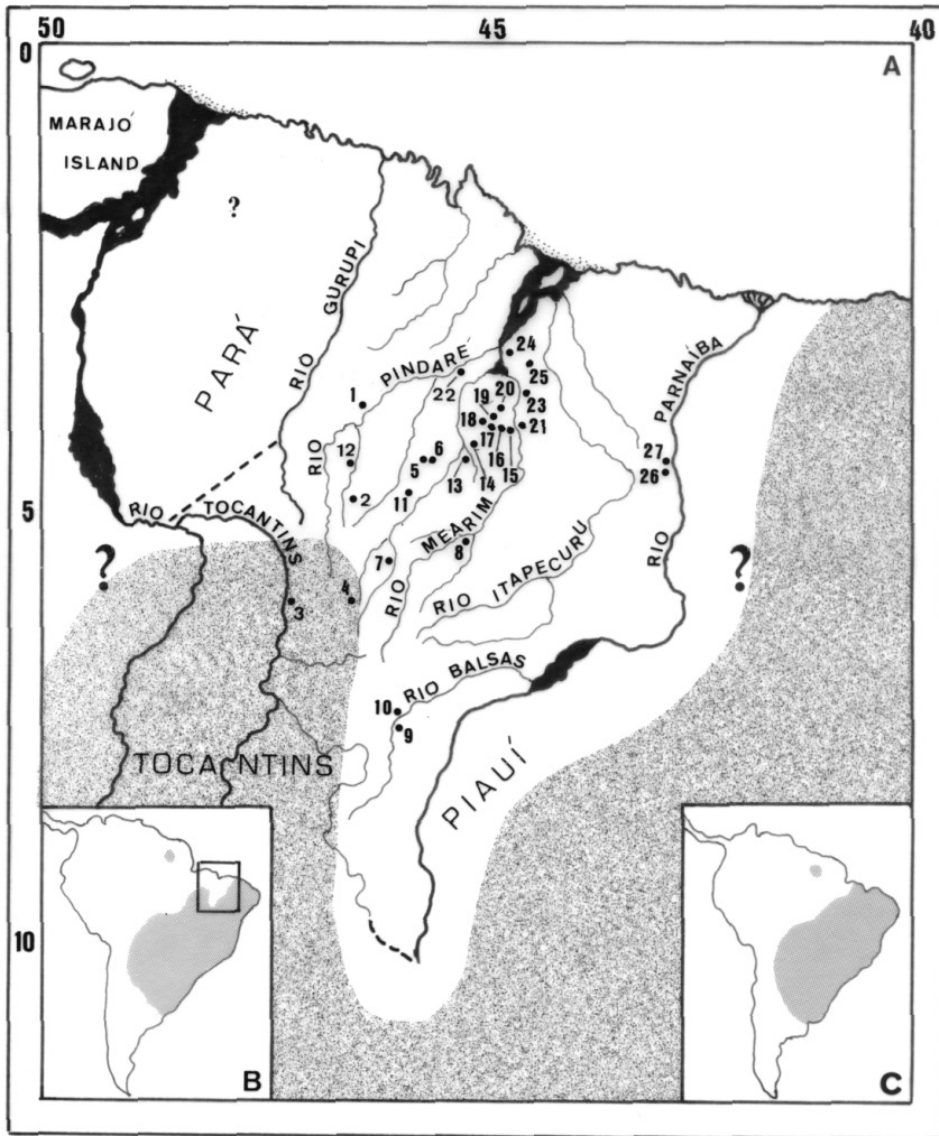


FIGURE 1. A. New localities for the occurrence of *Euphractus sexcinctus*; B. Area in main map; C. Distribution following this paper.



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dos Cocais" (*Orbignya* palm tree forest) is explicable because of the longer time we spent there.

The localities surveyed are in four biomes, and the animals were sighted in a wide variety of local habitats. In the "Pré-Amazônia Maranhense" (Amazonian part of Maranhão) yellow-armadillos used clearings, the border of primary/secondary forest, and the interior of the unflooded secondary forest. In the "Zona dos Cocais" the species was observed in a number of habitats including plantations in primary/secondary forest borders, plantations associated with "babaçual" (*Orbignya* clumps), "babaçual" associated with pasture, copses in different stages of regeneration, and secondary forest. The majority of observations was in "babaçual" associated with copses and in areas of intense anthropic activity (pastures and plantations). In the Cerrado region of the southern part of the state, the armadillos were observed on the border between the "cerrado" *sensu stricto* and the gallery forest of the Rios Balsas and Matão (with "babaçual" and stretches of plantations). Oliveira (1993, 1995) recorded the species in the Parque Estadual de Mirador, located between the Rios Alpercatas and Itapecurú, also in Cerrado. Transitional vegetation predominates in the eastern side of the state, a mosaic of *Orbignya*, Cerrado and Caatinga (xerophytic vegetation). A single animal was captured in an area in "cerradão". The information we obtained in almost all localities inventoried suggested an indiscriminate use of these habitats by *E. sexcinctus*.

### Discussion

Data from available literature indicate that *E. sexcinctus* is able to use a wide range of habitats. According to Mares *et al.* (1981), it supplants the armadillos of the genus *Dasybus*. Mares *et al.* (1981, 1985, 1989), Fonseca and Redford (1984), Schaller (1983), Wetzel (1985a), Redford and Wetzel (1985), Eisenberg (1989), Emmons and Feer (1990, 1997), Olmos (1995) and Brooks (1995) all listed *E. sexcinctus* as occurring in many mesohabitat types of Cerrado, Caatinga, Chaco, and forest borders.

The distributions proposed by Wetzel (1985b) and Redford and Wetzel (1985) for *E. sexcinctus* presented some inconsistencies that were later reproduced by Emmons and Feer (1990, 1997). Despite the emphasis of Emmons and Feer (1990, 1997) on the lack of knowledge about the species' occurrence inside forests, they presented a map encompassing the entire Atlantic Forest. The distributional limits they indicate around the state of Maranhão are not congruent with the major river courses, differences in altitude, or biome, and there mesohabitats which are otherwise occupied by *E. sexcinctus* extending well beyond. The motility of *E. sexcinctus*, makes it likely to occur throughout. The spatial distribution of the 27 localities surveyed suggests that there are no physical barriers for *E. sexcinctus* even extending well into the state of Maranhão. Despite the lack of information on the use of tall forest and coastal formations, the data suggests that all other landscape types (and associated mesohabitats) can be occupied by *E. sexcinctus*.

### Conclusions

The data presented here indicate that the geographic distribution of *E. sexcinctus* should include all of the state of Maranhão, enlarging considerably that previously portrayed by Wetzel (1985b) and Redford and Wetzel (1985). The new northwestern border proposed, extends to the Rio Gurupí (Fig. 1c) but further surveys should be carried out in eastern Pará, where, as in the Marajó archipelago, there are mesohabitats similar to those observed to the east in Maranhão.

### Acknowledgments

We are grateful to Mariana Moncassin Vale for her help in determining the geographic coordinates for many of the localities. Special thanks are due to Cibele Rodrigues Bonvicino for reviewing the text. The Brazilian Institute for the Environment (IBAMA) kindly provided permission to collect the specimens. Part of the work was carried out using grants from CNPq, FAPERJ, FUJB, PIE/CNPq and PROBIO.

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## A Translocation Experiment for the Conservation of Maned Sloths (*Bradypus torquatus*), a Species Threatened with Extinction in the Brazilian Atlantic Forest

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The Atlantic forest covered a significant part of Brazil before the arrival of Europeans in the early 1500s, but today is restricted to less than 10% of its original extent in forest remnants scattered through biological reserves and private properties. As a consequence, many species now have severely reduced and fragmented populations, significantly increasing the chances of extinction due to demographic and environmental stochasticity and genetic deterioration. It is becoming increasingly necessary, therefore, to intervene in order to reduce these risks and improve the conservation status of endangered species in this biodiversity "hotspot".

One initiative has been carried out with maned sloths (*Bradypus torquatus*), an Atlantic forest endemic. This species was chosen because it is a poorly-known forest dweller that is threatened with extinction mainly due to habitat loss and fragmentation. An ongoing experiment translo-

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cating maned sloths found in the urban zone and neighborhoods of Santa Teresa, a small town located in the state of Espírito Santo, in southeastern Brazil, was started in 1994. Maned sloths are found mostly during the rainy season (December-March), when dispersing individuals are seen wandering through inhospitable habitats (pastures, agriculture land, etc.), or happen to be found crossing roads in or near to the urban zone of the municipality. Captured animals are brought to the local biology museum (Museu de Biologia Mello Leitão), where they are examined, weighed, measured, fitted with radio-collars and released into protected forest reserves located in the region. Thus far the Santa Lúcia Biological Station (ca. 500 ha) and the São Lourenço Municipal Reserve (ca. 500 ha) have been selected as release sites.

The radio-collared animals are then monitored twice a month by trained observers, who find them in the forest and collect detailed data on ranging, activity budgets, and diet. Since 1994, five translocated adults have been monitored, but thus far observations have been restricted to the first year after release, not long enough to fully ascertain the success of the experiment. Data from previous work showed that individuals differ greatly in their space requirements, behavior and diet and, therefore, we now intend to collect additional data on other individuals as well as to prolong observations beyond the initial period of adaptation.

The project's main objective is to study the survival of victims of deforestation and other anthropogenic disturbances, when the animals are released back to larger, less disturbed forest tracts. It is essential to collect field data from as many individuals as possible, in order to know comprehensively the species capacity for adaptation, as well as its real requirements of space, forest types, and food sources. The once a year monitorings utilized till now have proved to be insufficient to conclude that maned sloths are amenable to such experiments, as they are long-lived and show much individual variation in diet (Chiarello, 1998b), activity budgets, and ranging patterns (Chiarello, 1998a). For example, individual home ranges esti-

mated during the first year varied from 3 to 6 ha, but it is not known if the sloths continue to stay in these home ranges for longer periods of time. We do not know if the marked preference the study animals show for some plant species (notably *Micropholis venulosa*, Sapotaceae) is repeated in subsequent years, or is also exhibited by other individuals released in other localities. It is essential, therefore, to monitor additional individuals and to extend the observation period beyond the first year after release in order to address these issues.

The methods used in this project are the same that have been used successfully since 1994 (Chiarello, 1998a, 1998b). During the sampling days study animals are observed continuously from dawn to dusk, allowing an exact quantification of their main activities, ranging, and diet. These data are then analyzed to study the capacity for adaptation to the translocation process, quantifying the changes that occur in home range, movements, time allocated to main activities, and importance of differing tree species as food sources. Interindividual differences in activity budgets, day and night range length, and home range are also compared.

For species with strictly forest habitat and low dispersion ability, as is typically exemplified by sloths, it is becoming increasingly necessary that we intervene to increase the chances of long-term survivorship and the loss of genetic diversity of isolated populations. The results of this project will be relevant to the conservation of maned sloths as this will represent an experimental analysis of translocation, a management tool that can also be used to help ameliorate the conservation status of other species and populations which are isolated in Atlantic forest remnants. Additionally, the project will contribute to the better understanding of the natural history of this poorly known species, and provide data about its food, habitat, and space requirements. Projects of this nature are necessary to prevent or diminish the continuous deforestation and fragmentation of animal communities in remnants of this highly diverse but greatly deforested biome (Chiarello, 1997, 1999).

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## Literature Cited

- Chiarello, A. G. 1997. Mammalian community and vegetation structure of Atlantic forest fragments in south-eastern Brazil. Doctoral thesis, University of Cambridge, Cambridge, U.K.
- Chiarello, A. G. 1998a. Activity budgets and ranging patterns of the Atlantic forest maned sloth, *Bradypus torquatus* (Xenarthra; Bradypodidae). *J. Zool.*, 246(1): 1-10.
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- Chiarello, A. G. 1999. Effects of fragmentation of the Atlantic forest on mammal communities in South-eastern Brazil. *Biol. Cons.*, 89: 71-82.

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## NEWS

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### Edentate Conservation Action Fund

The Edentate Specialist Group of the Species Survival Commission (SSC) of The World Conservation Union (IUCN) has established a conservation action fund which will offer small grants to support studies and conservation initiatives related to edentates. Financed by the Center for Applied Biodiversity Science at Conservation International, based in Washington, DC, the grants offered will be a maximum of US\$3,000, with a typical amount given around US\$1,000. The grant application process is designed to have a fast turn around time. Those interested in submitting a proposal should contact Jennifer Pervola, Center for Applied Biodiversity Science, Conservation International, 1919 M St., NW, Suite 600, Washington, DC, 20036, USA, e-mail: <j.pervola@conservation.org.>

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### New Specialist Groups

The SSC has several new Specialist Groups. The Afrotheria Group, chaired by Galen Rathbun, was created to cover the Superorder Afrotheria, which includes aardvarks, hyrax, golden-moles, elephant-shrews and tenrecs. A Caribbean Inland Freshwater Fishes Specialist Group was created as part of an evolving SSC strategy for freshwater fish. Co-Chairs are Michael Smith and Carlos Rodriguez. The Global Amphibian Specialist Group, chaired by Claude Gascon, will work towards developing a regionally-based network of amphibian specialists, using the model of SSC's Sustainable Use Specialist Group. The Iguana Specialist Group, formerly West Indian Iguana, has a new mandate to cover all species. Allison Alberts continues as Chair, with Jose Ottenwalder appointed as Co-Chair. The first regionally-based Invertebrate Specialist Group, the Southern African Invertebrates Specialist Group, has been established, chaired by Michael Samways. A new Philippine Plant Specialist Group, chaired by Domingo Madulid, will address the important issues relating to plant diversity conservation in the Philippines. A list of all SSC Specialist Groups and Task Forces with contact details, is available on the SSC website at <[www.iucn.org/themes/ssc/sgs/sgs.htm](http://www.iucn.org/themes/ssc/sgs/sgs.htm)>. Information from the IUCN Species Survival Commission E-Bulletin - February 2001.

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### Fauna and Flora International - The 100% Fund

Fauna and Flora International's 100% Fund offers a unique approach to the funding of small-scale conservation projects focused on the protection of endangered species throughout the world. It is one of very few grant sources for this purpose, especially for applicants from developing countries. It was set up in 1971 to provide money very quickly for urgent conservation action. Since then the Fund has supported more than 570 projects in over 120 countries. It provides grants to a wide diversity of projects ranging from popula-

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tion surveys of endangered animals and plants to education campaigns, and covers a wide range of species, from partulid snails to gorillas. The fund often favours projects where immediate action is needed or where efforts are directed towards less popular species.

The Fund is unique in that 100% of all donations pass directly to conservation projects, with no deductions for administration. Applications to the 100% Fund are assessed by a committee of respected international conservationists. Projects are selected on the basis of conservation importance, sound scientific principles, cost effectiveness and local involvement. Reports on the progress of the work must be submitted after six months and at the end of a project. These are reviewed by members of the conservation committee.

Objectives of the 100% Fund include sponsoring projects where conservation and research activities enhance the chances of survival for some of the world's most endangered species; implementation of small-scale projects for which funding is generally not available from any other source, especially for people applying from developing countries; the collection of information essential to the development of species action plans and IUCN listings, and from training opportunities provided to local peoples. Many 100% Fund projects involve an educational component, generating environmental awareness in local communities and providing grant recipients the benefit for personal development and skill-sharing by working alongside local people. The 100% fund is also an important mechanism for training young conservationists, many early recipients have since risen to prominent positions in the conservation world.

For donations to the fund or applications for grants, contact: Fauna and Flora International, Great Eastern House, Tenison Road, Cambridge CB1 2DT, UK, Tel: +44 (0)1223 571000, Fax: +44 (0)1223 461481, e-mail: <info@ffint.org>. Web site: <www.wcmc.org.uk/ffi>.

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## **Lincoln Park Zoo Neotropic Fund**

The Lincoln Park Zoo Neotropic Fund supports field research in conservation biology throughout Latin America and the Caribbean. The fund emphasizes support of graduate students and other young researchers, particularly those from Latin America. Since 1986, the fund has awarded over 126 grants in 19 countries. Between five and 15 projects are supported each year. Awards are seldom greater than US\$7,500, and most awards fall in the range of US\$3,000-\$6,000. Initial support is for up to 12 months from the date of award. Maximum duration of support is two years. Deadline for receipt of Neotropic proposals is 1 September. For additional information and application procedures see <www.lpzoo.com/conservation>, e-mail <conservation@lpzoo.org>, or write to: Lincoln Park Zoo Neotropic Fund, Department of Conservation and Science, Lincoln Park Zoo, Chicago, IL 60614, USA.

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## **IUCN/SSC Wildlife Trade Programme**

The goal of the IUCN/SSC Wildlife Trade Programme is to promote the conservation of wild species subject to trade by assessing the effect of trade on the status of species and generating recommendations and conservation strategies.

The work of IUCN'S Species Survival Commission (SSC) on the status of wild species involved in trade started over 10 years ago. The programme ran initially under the auspices of the Trade Specialist Group, established to enhance the SSC's scientific input to CITES (Convention on International Trade in Wild Fauna and Flora), and later as the Wildlife Trade Programme, coordinated by the SSC Secretariat. Gradually, the focus has broadened to encompass a wide range of trade issues. A major focus has been to identify species threatened by trade and to recommend actions to address these threats. This has involved working with Specialist Groups to monitor the status of species in trade and prioritise certain species for conservation action. Information is then relayed



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to decision makers within the international conservation community. The programme has, therefore, acted as a two-way process, encouraging the exchange of information between scientists and policy-makers.

The Wildlife Trade Programme works in collaboration with its partner organisations, the TRAFFIC Network and WCMC (World Conservation Monitoring Centre). SSC formally recognises TRAFFIC as its primary source of expertise on trade data, and TRAFFIC recognises SSC as its primary source of expertise on the biological status of species involved in trade. By combining the data produced by the two organisations, the impact of trade on wild species can be assessed.

The Programmes objectives are as follows: 1) To identify situations where trade in wild species appears unsustainable or detrimentally affects the status of non target species; 2) To focus on gaps in knowledge on the biology and status of species in trade; 3) To develop and promote those actions and/or mechanisms necessary to ensure the conservation of species detrimentally affected by trade; 4) To ensure that the SSC's expertise is used to influence the decisions of CITES and other relevant agreements; 5) To provide scientific support and capacity building to the Parties to CITES (and other relevant international agreements) in implementing conventions at national and regional levels and; 6) To increase understanding about CITES and other relevant agreements within the SSC network.

#### **Priority Action**

- Identify a focal point for trade issues in each taxonomic Specialist Group to ensure that SSC can provide high-quality information to policy makers.
- Support for Specialist Group Action Planning to identify species affected by trade which may be of conservation concern
- Determine where further information is needed on these species and stimulate the information collection.
- Work with interested parties to promote appropriate conservation action for species

identified.

- Provide general assistance to the CITES Secretariat and Parties between the meetings of the Conference of Parties (COP).
- Provide specific assistance to the Parties for the meetings of the COP by publishing: *CITES: A Conservation Tool, A Guide to Amending the Appendices to CITES*. This publication provides guidance through the Convention's articles and resolutions governing the submission, presentation and adoption of proposals to amend the appendices.
- The analyses of proposals to amend the CITES appendices, produced in collaboration with the TRAFFIC Network, providing an independent assessment of the information provided in the proposals.
- Support the CITES significant trade process by identifying species subject to 'significant' levels of trade and development of conservation and management programmes for species in trade in their country of origin.
- Assist CITES parties to review and, where it is necessary, to strengthen the capacities of their scientific authorities to undertake the monitoring and assessment procedures for wild species in trade.
- Contribute to policy documents, e.g., *CITES Guidelines for the Disposition of Confiscated Specimens, IUCN Re-introduction Guidelines and IUCN Guidelines for the Prevention of Biodiversity Loss due to Biological Invasion*.

The Wildlife Trade Programme aims to expand its work in three theme areas of particular conservation concern: trees, marine organisms, and medicinal plants and animals. The SSC tree networks are being further developed in conjunction with WCMC. Further emphasis is being placed on marine organisms. The Medicinal Plant Specialist Group is very active and a number of medicinal issues are of concern to animal Specialist Groups as well.

*Further information is available from:*

IUCN The World Conservation Union:

<[www.iucn.org](http://www.iucn.org)>

IUCN Species Survival Commission:

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<[www.iucn.org/themes/ssc](http://www.iucn.org/themes/ssc)>  
IUCN/SSC Wildlife Trade Programme:  
<[www.iucn.org/themes/ssc/programs](http://www.iucn.org/themes/ssc/programs)>  
TRAFFIC Network:  
<[www.traffic.org](http://www.traffic.org)>  
Convention on International Trade in Endangered  
Species of Wild Fauna and Flora:  
<[www.wcmc.org.uk/CITES](http://www.wcmc.org.uk/CITES)>

Information on CITES, list of parties, information on the meetings of the Conference of the Parties, text of the convention, appendices, reservations, resolutions and information on publications are available at the World Conservation Monitoring Centre: <[www.wcmc.org.uk](http://www.wcmc.org.uk)>, or contact the Wildlife Trade Programme directly at IUCN/SSC Wildlife Trade Programme, 219c Huntingdon Road, Cambridge CB3 0DL, UK, Tel: +44 (0)1223 277966, Fax: +44 (0)1223 277845, e-mail: <[iucn-ssc@wcmc.org.uk](mailto:iucn-ssc@wcmc.org.uk)>.

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### Reorganização da Coleção de Xenarthra do Museu Nacional

Foi concluída a revisão e a reorganização do material pertencente a Ordem Xenarthra, depositado no Museu Nacional da Universidade Federal do Rio de Janeiro (MNRJ). Até dezembro de 1997, a coleção era composta de 709 espécimes, assim distribuídos: *Bradypus torquatus* (15), *Bradypus tridactylus* (20), *Bradypus variegatus* (82), *Choloepus didactylus* (40), *Cabassous unicinctus* (11), *Cabassous tatouay* (19), *Chaetophractus villosus* (3), *Dasybus hybridus* (4), *Dasybus kappleri* (4), *Dasybus septemcinctus* (17), *Dasybus novemcinctus* (190), *Euphractus sexcinctus* (113), *Priodontes maximus* (12), *Tolypeutes matacus* (1), *Tolypeutes tricinctus* (14), *Zaedyus pichiy* (1), *Cyclopes didactylus* (27), *Myrmecophaga tridactyla* (30) e *Tamandua tetradactyla* (106).

Sérgio Maia Vaz, Museu Nacional, Seção de Mamíferos, Quinta da Boa Vista, S. Cristóvão, Rio de Janeiro 20940-040, Rio de Janeiro, Brasil.

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### Alwyn Gentry's Projects Continue at Missouri Botanical Garden

Botanist Alwyn Gentry died tragically in a plane crash on 3 August 1993 in western Ecuador. The Missouri Botanical Garden is, however, continuing his project on the study of the floristic diversity of the world's tropical forests. Gentry and his collaborators had surveyed nearly 250 sites on six continents, establishing and collecting data from 0.1 ha transects. A review of these studies has been compiled by James Miller, Oliver Phillips, and Nancy Hediger, and the raw data is available on the Garden's web site: <[www.mobot.org/MOBOT/research/applied\\_research/gentry.html](http://www.mobot.org/MOBOT/research/applied_research/gentry.html)>. The data for each site are being analyzed, and a volume summarizing the results will be published by the MBG. In addition to summarizing the transect data, the book will review the historical development of Gentry's ecological studies, the methods by which the data were collected, and their significance in contributing to our understanding of global patterns of plant diversity. Missouri Botanical Garden, Tel: 314 577 5169, Fax: 314 577 0830. From: *Tropinet*, 10(3), September 1999.

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### Canopy Citations Database

The Canopy Citations Database is now available on the World Wide Web. It contains over 1,300 citations regarding canopy ecology. Search for authors, titles, dates, journals, keywords or words within an abstract. Web site: <[www.evergreen.edu/canopycitations](http://www.evergreen.edu/canopycitations)>.

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### The International Foundation for Science

Mandated to promote high quality research on the management, use, and conservation of biological resources and their environment, the International Foundation for Science provides small research grants to scientists in and from a developing country or those employed in a developing coun-

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try institution. For further information contact: Grev Turegatan 19, 114 38 Stockholm, Sweden, Tel: (46) 8 545 818 00, e-mail: <info@ifs.se>.

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### **Fundação Biodiversitas – IUCN Brazil and an Address Change**

The Fundação Biodiversitas, President Aspásia Camargo, Director Luiz Carlos Cardoso Vale, took over the coordination of the Brazilian Committee of the World Conservation Union (IUCN) in February 2000. This decision was ratified during the last meeting of the Committee, 13-14 April 2000, at the Salto Morato Natural Reserve in Paraná.

The Fundação has changed its address. The new address of the Fundação Biodiversitas is: Rua Ludgero Dolabela 1012, 7o. Andar, 30430-130 Belo Horizonte, Minas Gerais, Brasil, Tel: (0)31 292 8235, Fax: (0)31 291 7658, e-mail: <biodiversitas@biodiversitas.org>. Home page: <www.biodiversitas.org>.

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### **IUCN/SSC Re-Introduction Specialist Group Chairman and Address Change**

The IUCN/SSC Re-Introduction Specialist Group office has moved from Nairobi, Kenya to Abu Dhabi, United Arab Emirates with chairman Dr. Mark Stanley-Price being replaced by Dr. Frederic Launay, head of the National Avian Research Center, Environmental Research and Wildlife Development Agency.

The new contact details for the Re-Introduction group are: Pritpal S. Soorae, Senior Conservation Officer, IUCN/SSC Re-Introduction Specialist Group, Environmental Research and Wildlife Development Agency, P.O. Box 45553, Abu Dhabi, United Arab Emirates. Tel: (D/L) 971 2 693 4506 or 693 4628. Fax: 971 2 693 4628. E-mail: <psoorae@erwda.gov.ae>.

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## **RECENT PUBLICATIONS**

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### ***2000 IUCN Red List of Threatened Species***

The *2000 IUCN Red List of Threatened Species*, 2000, 61pp, + CD-ROM, was launched on the 28<sup>th</sup> September 2000, in London, Washington, Geneva, and Ottawa. It was compiled by Craig Hilton-Taylor, with the assistance of Caroline Pollock, Matthew Linkie, Alan Mauric, Janice Long, Mariano Gimenez-Dixon, Simon Stuart, Alison Stattersfield, Martin Sneary, and Georgina M. Mace, in association with experts in the IUCN/SSC Species Survival Commission specialist groups and BirdLife International. Includes a foreword by David Brackett, Chair of the IUCN Species Survival Commission, and an introductory essay “A challenge to the global community” by Russell A. Mittermeier, President of Conservation International and Chairman of the Primate Specialist Group. Seven annexes: 1. Recent developments in the IUCN/SSC Red List Programme; 2. Organization of information; 3. Information sources and quality; 4. Habitat types authority file; 5. Threat types authority file; 6. The 1994 IUCN Red List categories and criteria; 7. Summary of the results of the review of IUCN Red List categories and criteria 1996-2000 (Georgina M. Mace). There are a number of innovations introduced to enhance the effectiveness of the List as a conservation tool. *Improved species coverage*: All bird species have been completely reassessed by BirdLife International and its partners; all primates have been reassessed following a consultative review workshop on primate systematics (see *Neotropical Primates* 8(2), pp.61-93); many other mammals, including antelope, bats, cetaceans, otters, wild pigs, wild cattle and wild goats, and some rodents were reassessed; improved coverage of sharks, rays and saw-fish; all South-east Asian freshwater turtles were comprehensively assessed; a number of new reptile and amphibian assessments from Brazil, the Philippines, Russian Federation and the Russian Republics were carried out; the correction of some insect information

and the addition of a number of new European butterfly assessments; correction of errors in the mollusc listings in the 1996 Red List, a thorough re-evaluation of all potentially extinct species of mollusc and the inclusion of a number of new assessments; all the tree assessments from *The World List of Threatened Trees* (Oldfield *et al.*, 1998) were incorporated and updated where necessary; all conifers were comprehensively reassessed; and new assessments for plants from Cameroon, Galápagos, Mauritius and South Africa were included, as were comprehensive assessments for the carnivorous plant genera *Nepenthes* and *Sarracenia*, and for the first time almost 100 assessments of mosses were included. *Peer review process*: carried out by the appointment of Red List Authorities responsible for the evaluation of all assessments on the Red List to help ensure the maintenance of standards and the correct application of the criteria. *Improved documentation*: with the inclusion of a rationale for many listings explaining how they were reached to improve accountability; provision of information on range, current population trends, main habitats, major threats and conservation measures taken; and improved documentation of extinct species. *Introduction of a petitions process*: whereby listings can be challenged. *Increased accessibility*: via a new web site and a CD-ROM. The web site provides a mechanism whereby users can feed corrections and additional information back to the Red List Programme. The web site is: <<http://www.iucn.org/redlist/2000/index.html>>.

The 2000 IUCN Red List of Threatened Species (Book with analysis and CD-ROM) is available only in English. Price: £30 or US\$45 at: IUCN Publication Services Unit, 219c Huntingdon Road, Cambridge, CB3 0DL, UK, Tel: +44 1223 277894, Fax: +44 1223 277175, e-mail: <[info@books.iucn.org](mailto:info@books.iucn.org)>, or order it through the Net at: <<http://www.iucn.org/bookstore/index.html>>. The above is the preferred address, it can also be ordered at the IUCN Publishing Division, IUCN-The World Conservation Union, rue Mauverney 28, CH-1196 Gland, Switzerland, Tel: +41 22 999-0111, Fax: +41 22 999-0010, e-mail:

<[cmc@hq.iucn.org](mailto:cmc@hq.iucn.org)>, WWW: <<http://iucn.org>>. US and Canadian customers may also order IUCN publications from: Island Press, Box 7, Covelo, California 95428, Tel: 800 828 1302 or +1 707 983 6432, Fax: +1 707 983 6414, e-mail: <[ipress@igc.apc.org](mailto:ipress@igc.apc.org)>. For publications out of print, photocopies can be obtained from the IUCN Library at IUCN-The World Conservation Union, rue Mauverney 28, CH-1196 Gland, Switzerland, Tel: +41 22 999 0135, Fax: +41 22 999 0010; e-mail: <[cet@hq.iucn.org](mailto:cet@hq.iucn.org)>. As the price varies, depending on the number of pages to photocopy and where they are to be mailed, please contact Ms Cecile Thiery with your request. Please specify if you wish for a copy of the full publication or just part of it, as well as your mailing address.

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### ***A Fauna Ameaçada de Extinção do Estado do Rio de Janeiro***

*A Fauna Ameaçada de Extinção do Estado do Rio de Janeiro*, compiled by Helena de Godoy Bergallo, Carlos Frederico Duarte da Rocha, Maria Alice dos Santos Alves and Monique van Sluys. 2000, 168pp. Editora da Universidade do Estado do Rio de Janeiro (EDUERJ), Rio de Janeiro. ISBN 85 85881-92 5. The Red List of threatened animals for the state of Rio de Janeiro, Brazil. Chapter 10 (pages 125-135) dealing with the mammals, WAS compiled by Helena de Godoy Bergallo, Lena Geise, Cibele Rodrigues Bonvicino, Rui Cerqueira, Paula S. D'Andrea, Carlos Eduardo Esberárd, Fernando A. S. Fernandez, Carlos Eduardo Grelle, Adriano Peracchi, Salvatore Siciliano and Sérgio Maia Vaz. The following species of edentates were listed: Giant anteater, *Myrmecophaga tridactyla* (Probably Extinct), maned sloth, *Bradypus torquatus* (Endangered), and giant armadillo, *Priodontes maximus* (Critically Endangered). *Cabassous tatouay* and *Dasyypus septemcinctus* were listed as "Presumed Threatened". Overall, of 176 mammals considered for the state, 43 (24.4%) are listed as threatened, and a further 34 (19.3%) as presumed threatened. *Available from*: Editora da Universidade do Estado



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do Rio de Janeiro (EDUERJ), Rua São Francisco Xavier 524, Maracanã, Rio de Janeiro 2.0550-013, Rio de Janeiro, Brazil, Tel/Fax: +(0)21 587 7788, 587 7789.

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### **Conservation Biology – Special Section on Habitat Disturbance**

The December 2000 issue, Vol. 14(6), of *Conservation Biology*, the Journal of the Society for Conservation Biology, has a special section with 12 articles devoted to the theme “Habitat Disturbance and Tropical Rainforest Mammals”, put together by the Guest Editor Alfredo D. Cuarón of the Departamento de Ecología de los Recursos Naturales, Instituto de Ecología, Universidad Nacional Autónoma de México, Michoacán, México. It includes the following papers: A global perspective on habitat disturbance and tropical rainforest mammals, A. D. Cuarón, pp.1574-1579; Monitoring mammal populations in Costa Rican protected areas under differing hunting restrictions, E. Carrillo, G. Wong and A. D. Cuarón, pp.1580-1591; Habitat mosaic, wildlife availability, and hunting in the tropical forest of Calakmul, Mexico, A. Escamilla, M. Sanvicente, M. Sosa and C. Galindo-Leal, pp.1592-1601; Bushmeat markets on Bioko Island as a measure of hunting pressure, J. E. Fa, J. E. Garcia Yuste and Ramon Castelo, pp.1602-1613; Roads, development, and conservation in the Congo basin, D. Wilkie, E. Shae, F. Rotberg, G. Morelli and P. Auzel, pp.1614-1622; Influence of timber extraction routes on Central African small-mammal communities, forest structure, and tree diversity, J. R. Malcom and J. C. Ray, pp.1623-1638; Effects of habitat disturbance and protected areas on mammals of Peninsular Malaysia, R. K. Laidlaw, pp.1639-1648; Density and population size of mammals in remnants of Brazilian Atlantic forest, A. G. Chiarello, pp.1649-1657; Effects of human colonization on the abundance and diversity of mammals in eastern Brazilian Amazonia, M. A. Lopes and S. F. Ferrari, pp.1658-1665; Bat diversity and abundance as indicators of disturbance in Neotropical rainfor-

ests, R. A. Medellín, M. Equihua and M. A. Amin, pp.1666-1675; Effects of land-cover changes on mammals in a Neotropical region: A modeling approach, A. D. Cuarón, pp.1676-1692; Bat and bird-generated seed rains at isolated trees in pastures in tropical rainforest, J. Galindo-González, S. Guevara and V. J. Sosa, pp.1693-1703.

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### **Hunting and Biodiversity Conservation, and Tropical Forest Management—Two Publications**

In September 2000, The World Bank in collaboration with the Wildlife Conservation Society (WCS), New York, published two important documents on hunting and biodiversity conservation. They are monographs in the *Biodiversity Series – Impact Studies, Environment Department Papers*. The first, “Biodiversity Conservation in the Context of Tropical Forest Management” by Francis E. Putz, Kent H. Redford, John G. Robinson, Robert Fimbel and Geoffrey M. Blate, 80pp., has six chapters, as follows: 1. Introduction; 2. Disaggregating “Biodiversity”; 3. Disaggregating “Logging”; 4. Impacts of Forest Management on Biodiversity; 5. Overview of Biodiversity Conservation in Relation to Logging and Other Silvicultural Treatments; 6. Recommendations. There are seven appendices. The second, “Hunting of Wildlife in Tropical Forests: Implications for Biodiversity and Forest Peoples”, by Elizabeth L. Bennett and John G. Robinson, 42pp., is based on the book recently published by the same authors, *Hunting for Sustainability in Tropical Forests*, Columbia University Press, New York, 2000. Besides an executive summary, it has five chapters: 1. Introduction; 2. The Sustainability of Hunting in Tropical Forests; 3. Factors Affecting the Sustainability of Hunting; 4. Enhancing the Sustainability of Hunting; 5. Conclusions and Recommendations. Copies are available from: Environment Department, The World Bank, 1818 H Street, NW, Washington, DC 20433, USA, Tel: +1 202 473-3641, Fax: +1 202 477 0565.



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## References

- Putz, F. E., Redford, K. H., Robinson, J. G., Fimbel, R. and Blate, G. M. 2000. Biodiversity conservation in the context of tropical forest management. *Biodiversity Series – Impact Studies, Environment Department Papers 75*: 80pp. The World Bank, Washington, DC.
- Bennett, E. L. and Robinson, J. G. 2000. Hunting of wildlife in tropical forests: Implications for biodiversity and forest peoples *Biodiversity Series – Impact Studies, Environment Department Papers 76*: 42pp. The World Bank, Washington, DC.

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## **Publicações Avulsas do Instituto Pau Brasil de História Natural**

The new official journal of Instituto Pau Brasil de História Natural (IPBHN), Director Dr. Paulo Auricchio, focuses on various themes in natural history, including Biology, Zoology, Botany, and Ecology and gives special emphasis to Environmental Education. Manuscripts can be sent in Portuguese, Spanish and English. The main objective of the IPBHN is to divulge scientific studies as the first step to understanding the world we live in and promote the preservation of its biodiversity and natural ecosystems. For subscriptions to *Publicações Avulsas* (three issues are already available) please visit the home page <bulletin@institutopaubrasil.org.br> or write to IPBHN (Revista), c/o Ana Maria de Souza (Editor), Caixa Postal 282, Arujá 07400-970, Sao Paulo, Brazil.

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## **Conservation Biology In Practice**

Blackwell Science has launched a new magazine – *Conservation Biology in Practice*. It is designed for people who are short on time but long on information needs. It includes the following sections: Reviews; Features (new information and thought provoking concepts and practices); Case studies (successes, failures and lessons to be learned, new approaches and strategies); Tools and Techniques;

Numbers in Context (graphs, charts and tables and other data with minimal text to give readers a quick accessible way to grasp conservation trends); and Resources (book reviews, web sites and other sources of practical conservation information). The editors welcome articles that reflect clear and innovative thinking, ideas that can be translated into management action, and outstanding, jargon-free writing. Manuscript outlines (suggestions) and texts can be sent to: Conservation Biology in Practice, Department of Zoology, Box 351800, University of Washington, Seattle, WA 98195-1800, USA, Tel: 206 685-4724; Fax: 206 221-7839, e-mail: <kkohm@u.washington.edu>. It is published quarterly, and subscription rates are as follows: US\$30 in the USA, US\$35 for Canada and Mexico, and US\$40 overseas. Institution rates: US\$75 in the USA, US\$80 for Canada and Mexico, and US\$85 overseas. Write to: Journal Subscription Department, Blackwell Science, Inc., 350 Main Street, Malden, MA 02148, USA.

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## **Phenology and Seasonality**

The journal *Phenology and Seasonality* is published quarterly by SBP Academic Publishing, Amsterdam and New York. The first issue came out in the fall of 1996. The Editor-in-Chief is Helmut Lieth, University of Osnabrueck, and the Executive Editor is Frank-M. Chmielewski, Humboldt University of Berlin. The purpose of *Phenology and Seasonality*, the first international journal on this discipline, is to provide a worldwide basis for communication among scientists who deal with phenological observations. Topics covered include: National and international activities in the area of phenology and seasonality; annual cycles in the atmosphere, hydrosphere, and in the soil; investigations of impacts of climatological or other factors on phenological events; impact of climate variations and climatic changes on seasonal events; annual growth patterns of plants and development patterns of animals; seasonal and diurnal behaviour of animals; periodicity of pests and diseases; linkage of remotely-sensed information to phenological data; and development of season-

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ally-forced models (statistical and process-based). Annual subscriptions: Institutional DFL120 or US\$159; Individual-DFL120.00 or US\$75. For more information: SPB Academic Publishing, P. O. Box 11188, 1001 GD Amsterdam, The Netherlands, Fax: +31 20 638 0524, e-mail: <kugler@pi.net>, or c/o Demos Vernande, Order Department, 386 Park Avenue South, Suite 201, New York, NY 10016, USA, Fax: +1 212 683 0118.

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### **Regional Environmental Change - A New Journal**

In 1999, the Dutch publishers Springer launched a new quarterly journal, *Regional Environmental Change*, ISSN 1436-3798. The aim is to focus on the interactions of human and natural systems at the regional level within the context of global change. Regions considered are river catchments, estuaries, deltas, adjacent seas and wetlands as well as the interactions between cities and their environments. Disciplinary, but in particular multidisciplinary, approaches to the study of these systems are considered. The Editor-in-Chief is Dr. Wim Salomans, GKSS Research Centre and Free University Amsterdam, Max-Planck-Strasse, D21502 Geesthacht, Germany. More information from: Springer for Science, PO Box 503, 1970 AM IJmuiden, The Netherlands, Fax: +49 30 82787 448, e-mail: subscriptions@springer.de. Website: <www.springer.de>.

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### **Cadernos FBDS**

The Fundação Brasileira para o Desenvolvimento Sustentável (FBDS) is a non-governmental organization, based in Rio de Janeiro, which, as its name suggests, works to promote the rational use and conservation of natural resources in Brazil. In 1998, FBDS initiated a publication series-*Cadernos para o Desenvolvimento Sustentável FBDS*.

The first volume, entitled *Conservação da Biodiversidade na Amazônia Brasileira: Uma Análise*

*do Sistema de Unidades de Conservação* (1998, 65pp., in Portuguese), was written by Anthony B. Rylands and Luiz Paulo de S. Pinto, both of Conservation International. It contains an analysis of the protected areas system in the Brazilian Amazon and includes the following chapters: 1) Introduction; 2) History and evolution of the protected areas system in the Brazilian Amazon; 3) Bases for planning a protected areas system in the Brazilian Amazon; 4) Current situation of the protected areas; 5) Protected areas and biodiversity conservation in the Brazilian Amazon.

The second volume of *Cadernos FBDS* publishes the proceedings of the *Workshop: Forest Policies and Sustainable Development in the Amazon* (1998, 159pp., in Portuguese and English), organized by FBDS in collaboration with the United Nations Development Program (UNDP), and held in Rio de Janeiro, 14-126 July, 1997. Volume 2 includes the following chapters: Preface - Israel Klabin, President, FBDS, and Ralph Schmidt, Director, Forest Programme Sustainable Energy and Environment Division, UNDP, pp.3-4; Executive Summary - Ângelo A. dos Santos, Milagre Nuvunga and Eneas Salati, pp.7-14; Economic considerations pertaining to the expansion of logging in the Amazon - Jeffrey R. Vincent, pp.15-24; Impact of international tropical timber trade on the Amazon Rainforest - M. L. Joshi, pp.25-39; Mercado nacional de madeiras tropicais - Ivan Tomaselli, pp.41-49; Geração, disponibilidade e uso de informações para manejar florestas na Amazônia - Paulo Barreto, pp.51-59; Certificação socioambiental, bom manejo florestal e políticas públicas - Virgílio M. Viana, pp.61-70; Forest concession policies and sustainable forest management of tropical forests - John A. Gray pp.71-112; Política florestal coerente para Amazônia - Adalberto Veríssimo and Carlos Souza Júnior, pp.113-118; Some suggested contract provisions for forestry contracts on land owned by the Federative Republic of Brazil - David N. Smith, pp.119-134; Annotated bibliography - Namrita Kapur, pp.135-155. For further information please contact **Ângelo Augusto dos Santos**, Coordinator for External Affairs, Fundação Brasileira para o Desenvolvimento Sustentável (FBDS),

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fbds@ax.ibase.org.br>.

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### **Global Biodiversity**

*Global Biodiversity* is a quarterly magazine published by the Canadian Museum of Nature, Ottawa, dedicated to all aspects of biological diversity research and conservation. Besides regular articles, it includes updates and news on such as biodiversity policy, biosafety, meetings, and conservation. Two theme issues have been produced, one on Ecoforestry (1997), and another on Ecoagriculture (1998). For more information, write to *Global Biodiversity*, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, Canada, Tel.: (888) 437-6287, Fax: (613) 566 4673, e-mail: <sswan@mus-nature.ca>. World Wide Web: <<http://www.nature.ca/english/gbzine.htm>>.

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### **Museu de Biologia Mello Leitão – Brasil**

No ano de 1949, o naturalista Augusto Ruschi fundou o Museu de Biologia Professor Mello Leitão, na cidade de Santa Teresa, Espírito Santo, Brasil. Iniciou naquele ano a edição do *Boletim do Museu*, e de 1949 a 1985 foram impressos 390 títulos, dentro de séries de Biologia, Zoologia, Botânica, Proteção à Natureza, Antropologia, Divulgação e Geologia. O último número do Boletim foi publicado em 1985, ano anterior ao seu falecimento. Após a reestruturação do Museu, em 1992, as sete séries foram fundidas passando o periódico a se chamar *Boletim do Museu de Biologia Mello Leitão – Nova Série*. Desde então a publicação passou a publicar contribuições para a biologia que não se restringem a trabalhos realizados no Museu, mas que em geral são de autoria de pesquisadores vinculados ao Museu. Em 1996, o Conselho Científico do Museu foi instituído, e assumiu a função de Conselho Editorial do Boletim, que vem sendo publicado semestralmente.

No ano de 1999, por ocasião de cinquentenário do Museu foi editado um volume especial comemorativo, com artigos de membros do Conselho Científico e de pesquisadores vinculados que tem colaborado com o Museu nos últimos anos, especialmente aqueles oriundos do projeto “Biodiversidade da Mata Atlântica no Estado do Espírito Santo”. Assim foi publicado a “Edição Comemorativa dos 50 Anos do Museu”, números 11 e 12, junho de 2000. A publicação prestou homenagem também a Augusto Ruschi, pela sua iniciativa de criar um periódico que tem dado uma relevante contribuição à biologia e conservação da biodiversidade no Brasil.

*Conteúdo:* A Estação Biológica de Santa Lucia, Santa Teresa, Espírito Santo - S. L. Mendes & M. da P. Padovan, pp.7-34; Espécies vegetais descritas a partir de espécimes coletados na Reserva Florestal de Linhares, Espírito Santo, Brasil - P. Germano Filho, A. L. Peixoto & R. M. de Jesus, pp.35-48; Células piramidais apicais dos tegumentos do óvulo em Velloziaceae e suas relações filogenéticas - N. L. de Menezes & N. M. de Castro, pp.49-56; Recursos de Bromeliaceae utilizados por beija-flores e borboletas em Mata Atlântica no Sudeste do Brasil - I. G. Varassin & M. Sazima, pp.57-70; Diversidade de Lepidoptera em Santa Teresa, Espírito Santo - K. S. Brown, Jr. & A. V. L. Freitas, pp.71-116; Perfil da fauna de himenópteros parasitóides (Insecta, Hymenoptera) em uma área de Mata Atlântica da Reserva Biológica de Duas Bocas, Cariacica, Brasil - C. O. Azevedo & H. S. Santos, pp.117-126; Studies on Neotropical Protoneuridae. 10. *Forcepsioneura lucia* sp.n. from the Parque Estadual Rola Moça, Minas Gerais, Brazil (Odonata, Zygoptera) - Â. B. M. Machado, pp.127-134; Ecology of *Lep-tagrion perlongum* Calvert, 1909: A bromeliad-dweller odonate species - P. de Marco Júnior & K. S. Furieri, pp.135-148; Composição da avifauna da Estação Biológica de Santa Lúcia, Santa Teresa - ES - J. E. Simon, pp.149-170; Descrição do comportamento de corte do dançarino-de-coroa-vermelha, *Machaeropterus regulus* (Aves, Pipridae) - M. L. da Silva, G. Baudet, T. Sigrist & J. Vielliard, pp. 171-188; Reintrodução do tucano-de-bico-preto (*Rhampastos vitellinus ariel* Vigors, 1826)

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no Parque Nacional da Tijuca (Rio de Janeiro - RJ) e notas sobre sua distribuição geográfica - A. F. Coimbra-Filho, pp.189-200; Non-volant mammals of the Estação Biológica de Santa Lúcia and adjacent areas of Santa Teresa, Espírito Santo, Brazil - M. Passamani, S. L. Mendes & A. G. Chiarello, pp.201-214; Análise da comunidade de marsupiais em Mata Atlântica de Santa Tereas, Espírito Santo - M. Passamani, pp.215-228; Influência da caça ilegal sobre mamíferos e aves das matas de tabuleiro do norte do estado do Espírito Santo - A. G. Chiarello, pp.229-247. *Available from:* Biblioteca, Museu de Biologia Mello Leitão, Avenida José Ruschi 4, 29650-000 Santa Teresa, Espírito Santo, Brasil.

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## Books

*Classification of Mammals*, by Malcolm C. McKenna and Susan K. Bell, 2000, 631pp. Columbia University Press, New York. ISBN 0 231 11013 8 (paper), 0 231 11012 X (cloth). Price: US\$50.00 (paperback); US\$175 (cloth). This is the first comprehensive classification to appear in more than 50 years. Since George Gaylord Simpson's 1945 classification, the paleontological record has been greatly expanded, the timescale recalibrated, and much debate and progress concerning the theoretical underpinnings of systemization has occurred. McKenna and Bell have constructed a completely updated hierarchical system that reflects the genealogy of the Mammalia. *Available from:* Columbia University Press, Order Department, 136 South Broadway, Irvington, NY 210533, USA, Tel: (800) 944 8648 or (914) 591 9111, or Columbia University Press, c/o John Wiley and Sons, Ltd., 1 Oldlands Way, Bognor Regis, West Sussex PO22 95A, England, UK, Tel (1243) 779 777, e-mail: <customer@wiley.co.uk>. Web site: <Columbia.edu/cu/cup>.

*Brazilian Perspectives on Sustainable Development of the Amazon Region*, edited by Miguel Clüsener-Godt and Ignacy Sachs, 1995, 330pp. ISBN 1 85070 576 3. Hardcover. Price: £45/US\$68. Vol. 15. Man and the Biosphere Series (editor J. N. R. Jeffers). The Parthenon Publishing Group, Carnforth, UK, and UNESCO, Paris. A scientific reference text on Amazonian ecology, resource use and development. Contents: Introduction; Climatic and hydrological conditions as key factors for eco-development strategies; Development and management plans for the Amazon region; The Amazon an urbanized forest; Socio-diversity and biodiversity; Agroforestry in Brazil's Amazonian development policy; Rehabilitation of capoeiras; Degraded pastures and mining sites; The Amazon and extracting activities; Development of commercial fisheries in the Amazon basin and consequences for fish stocks and subsistence fishing; Mining without destruction; Organizing research for the development of the Amazon region; Possibilities for sustainable agriculture development in the Brazilian Amazon; Elements for a strategy for territorial settlement and eco-development in the Amazon. *Available from:* The Parthenon Publishing Group, UK Office, Casterton Hall, Carnforth, Lancs LA6 2LA, UK, Tel: +44 (0)15242 72084, Fax: +44 (0) 15242 71587; USA Office, One Blue Hill Plaza, P.O.Box 1564, Pearl River, New York, 10965, USA, Tel: +1 914 735 9363, Fax: +1 (914) 735 1385. Web site: <<http://www.parthpub.com>>.

*Conservation of Biological Resources*, by E. J. Milner-Gulland and Ruth Mace (with contributors), 1998, 416pp, 114 illustrations. Blackwell Science, Oxford. Paperback ISBN 0 86554 2738 0. Price: £24.95. A student textbook presenting the issues surrounding the biological conservation of species and ecosystems used by humans. It is aimed at final year undergraduate and Master's level students as well as conservation professionals, including managers, policy-makers and researchers. *Contents:* Part One. Introduction to Biological Conservation and Sustainable Use. Part Two. Theoretical Background. 1. The ecological and economic theory behind sustainable harvesting.



2. Harvesting and ecological realities. 3. Decision-making by users of natural resources. 4. Practical considerations when applying the theory. Part Three. Case Studies. Part Four. Making Conservation Work. Part 3 includes contributions by Kathy Mackinnon (Sustainable use as a conservation tool in the forests of South-east Asia), R. E. Gullison (Will bigleaf mahogany be conserved through sustainable use?), Vivienne Solis Rivera and Steven Edwards (Cosigüina, Nicaragua: A case study in community-based management of wildlife), Sophie des Clers (Sustainability of the Falkland Islands loligo squid fishery), Andrew Price, Callum Roberts and Julie Hawkins (Recreational use of coral reefs in the Maldives and Caribbean), Joel Freehling and Stuart A. Marks (A century of change in the Central Luangwa Valley of Zambia), M. Norton-Griffiths (The economics of wildlife conservation policy in Kenya), Tom Butynski and Jan Kalina (Gorilla tourism: A critical look), Anne Gunn (Caribou and muskox harvesting in the Northwest Territories), and Leonid Baskin (Hunting of game mammals in the Soviet Union). *Available from:* Anna Van Opstal, Blackwell Science Ltd., Osney Mead, Oxford OX2 0EL, UK, Tel: +44 (0)1865 206206, Fax: +44 (0)1865 721205. Website: <<http://www.blackwell-science.com>>.

*Species Coexistence*, by M. Tokeshi, 1998, 464pp. 159 illustrations. Blackwell Science, Oxford. Paperback ISBN 0 86542 744 5. Price: £37.50. *Contents:* Introduction: conceptual threads; Origination: the basis of coexistence; Origination and evolution of communities; Patterns in species richness: temporal dimension; Patterns in species richness: spatial dimension; The niche, resources and species assembly; Niche apportionment and relative abundances of coexisting species; Competition, co-operation and coexistence; Agent-mediated coexistence: predation and disturbance; Patchiness, heterogeneity and stochasticity; Traits and coexistence; Stability and conservation of coexisting species; Concluding remarks. *Available from:* Anna Van Opstal, Blackwell Science Ltd., Osney Mead, Oxford OX2 0EL, UK, Tel: +44 (0)1865 206206, Fax: +44 (0)1865 721205. Website: <<http://www.blackwell-science.com>>.

*Priorities for the Conservation of Mammalian Diversity: Has the Panda Had Its Day?* Edited by Abigail Entwistle and Nigel Dunstone, 2000, 455pp. Cambridge University Press, Cambridge. ISBN 0 521 77279 6 (hardback), 0 521 77536 1 (paperback). This book is No. 3 in the Conservation Biology series of CUP, edited by Morris Gosling in Association with the Zoological Society of London. No. 1 was *Conservation in a Changing World*, edited by Georgina M. Mace, Andrew Balmford and Joshua R. Ginsberg, and No. 2 was *Behaviour and Conservation*, edited by L. M. Gosling and J. Sutherland. This excellent review has three parts, besides an introductory chapter by Abigail Entwistle, Simon Mickleburgh and Nigel Dunstone – Mammal conservation: current contexts and opportunities. Part 1. Justifying the conservation of mammals. Part 2. Setting priorities for mammalian conservation. Part 3. Conservation approaches for mammalian species and diversity. Orders in the USA: Cambridge University Press, 40 West 20<sup>th</sup> Street, New York, NY 10011-4211, USA. Orders elsewhere: Cambridge University Press, The Edinburgh Building, Cambridge CB2 1BR, UK. E-mail to Hannah Proctor <[hproctor@cup.cam.uuc.uk](mailto:hproctor@cup.cam.uuc.uk)>. Web site: <<http://www.cambridge.org>>.

*Behavioral Approaches to Conservation in the Wild*, edited by Janine R. Clemmons and Richard Buchholz, 1997, 400pp. Cambridge University Press, Cambridge, UK. Hardback ISBN 0 521 58054 4. Price: £55.00 (+p&t), paperback ISBN 0 521 58960 6. Price: £19.95 (+p&t). This book is unique in emphasizing conservation of wild populations as opposed to captive and reintroduced, where behavioral research has concentrated in the past. The variety of expertise in this volume demonstrates that the complete ethological framework, not just behavioural ecology, provides valuable techniques and knowledge for conserving biodiversity. Issues addressed include: the limits and potentials of behavioral research to conservation; the importance of behavioral variation as a component of biodiversity, and the use of animal behavior to solve conservation problems and provide specific direction for research and



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management practices. Contents: Part I: Problems and issues; Part II: Conservation and the four levels of behavioral study; Part III: Examples and case studies. Available from: Customer Services Department, Cambridge University Press, The Edinburgh Building, Cambridge CB2 1BR, UK, Fax: +44 (0)1223 325152, e-mail: <directcustserve@cup.cam.ac.uk>.

*The Enchanted Amazon Rain Forest: Stories from Vanishing World*, by Nigel J. H. Smith, 1996, 208pp. ISBN 0 8130 1577 1. Price US\$29.95. University Press of Florida, Gainesville. Compiled during Nigel Smith's quarter-century of fieldwork in the Amazon, the stories reflect the resilient culture of millions of small farmers, hunters and fisherfolk along the region's waterways and pioneer roads. Their lore is an intriguing blend of indigenous European and African religious beliefs spanning all aspects of daily life and including a wide assortment of ghosts, monsters and enchanted places. As a backdrop to the tales, Smith provides information on the flora and fauna of the area, on the geographical and historical setting, and in particular on the problems of rain forest conservation. With its intimate photographs, also by Nigel Smith, this book will appeal to the general public as well as to ecologists, anthropologists, botanists, natural historians, and all others working in the Amazon basin. Available from: University Press of Florida, 15 NW 15th Street, Gainesville, Florida 32611-2079, USA. Tel: (352) 392-1351. Tel: (toll free): 1 800 226 3822.

*Livro Vermelho das Espécies Ameaçadas de Extinção da Fauna de Minas Gerais*, edited by Ângelo B. M. Machado, Gustavo A. B. da Fonseca, Ricardo B. Machado, Ludmilla M. de S. Aguiar, and Livia V. Lins, 1998, 605pp., 33 color plates. Fundação Biodiversitas, Belo Horizonte. In Portuguese. Price: Paperback US\$35 (+p&cp). A beautifully produced book describing 178 threatened animals of the state of Minas Gerais, Brazil, including 40 mammals, 83 birds, 10 reptiles, 11 amphibians, 3 fishes, 27 insects, 1 onychophore and 3 oligochaetes. Contents: Preâmbulo Ângelo B. M. Machado, pp.11-12; Apresentação

- Secretaria de Estado da Educação, Secretaria de Estado do Meio Ambiente, Instituto Estadual de Florestas & Fundação Biodiversitas, p.13; Prefácio - Célio de Murilo de Carvalho Valle, pp.15-16; Organização geral do livro, pp.21-25; Panorama geral da fauna ameaçada de Minas Gerais - Gustavo A. B. da Fonseca, pp.27-30; Há doze mil anos: A grande extinção - Cástor Cartelle, pp.31-35; Mamíferos, pp.37-169; Aves, pp.173-391; Répteis, pp.417-443; Anfíbios, pp. 445-475; Peixes, pp.477-491; Insetos, pp.493-561; Onicóforos, pp.563-569; Oligoquetas, pp.571-583; Índice remissiva de nomes populares, pp.585-587; Índice de nomes científicos, pp.589-591; Índice de ilustrações, p.593; Glosário, pp.595-605. For each species there are summary data sheets (including categorization in other national and international threatened species lists, and their occurrence in protected areas) and sections on general information (description, distribution, and natural history), the principal threats and the principal strategies necessary for their conservation, and a distribution map. Species of edentates included are: *Tolypeutes tricinctus*, *Priodontes maximus*, *Cabassous unicinctus*, *C. tatouay*, *Tamandua tetradactyla* and *Myrmecophaga tridactyla*. A most valuable reference. Available from: Fundação Biodiversitas, Avenida do Contorno 9155, 11º. Andar, Caixa Postal 1462, 30110-130 Belo Horizonte, Minas Gerais, Tel: +55 (0)31 291 9673, Fax: +55 (0)31 291-7658, e-mail: <cddb@gold.horizontes.com.br>.

*A Field Guide to the Mammals of Central America and South-East Mexico*, by Fiona A. Reid, 1997, xvii + 334pp. Oxford University Press, New York. ISBN 0 19 506400 3, hardback, and ISBN 019 506401 1, paperback. Price: Hardback £45.00, paperback £22.50. This field guide provides detailed accounts and range maps for all species of terrestrial and aquatic mammals of Central America and southern Mexico. With 48 color plates illustrating 85% of the species, 11 line drawings, an extensive bibliography, and sections on how and where to find mammals. Available from: Order Department, Oxford University Press, Saxon Way, West Corby, Northampton-

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shire NN18 9ES, UK, 24-hour credit card hotline +44 (0)1536 454534, Fax: +44 (0)1536 454518, e-mail: <book.orders@oup.co.uk>.

*Planning, Proposing, and Presenting Science Effectively: A Guide for Graduate Students and Researchers in the Behavioral Sciences and Biology*, by Jack P. Hailman and Karen B. Strier, 182pp. 1997. Cambridge University Press, Cambridge. ISBN 0 521 56023 3 (hardback), 0 521 56875 7 (paperback). An excellent and useful guide to writing - a must not only for graduate students and researchers but also for editors. The guidelines apply equally to independent projects focused on biology, directed study projects, and undergraduate senior theses, as well as to master's theses, doctoral dissertations and research aimed at publication. It guides the reader through a discussion of the nature of scientific research, how to plan research, and obtain fundings; discusses writing a research proposal, whether for a formal proposal or for thesis research to be written by a graduate student, or for a research proposal for a funding agency such as the National Science Foundation (using the Dissertation Improvement Grant format as a specific example); deals with writing a research report such as a graduate thesis, or a manuscript for publication in a research journal; gives advice and guidelines for presenting the results of research at research seminars and scientific meetings, and also provides useful tips on preparing abstracts and posters; shows how to write an effective C.V.; gives tips on how to write clearly, common abbreviations (including Latin phrases), and difficult inflections, as well as other issues; and provides a final appendix with a number of useful Word Wide Web addresses for U.S. grant sources. Throughout, the book is illuminated with personal examples from the author's own experiences with research on behavioral ecology, and there is a strong emphasis on problems associated with field studies. All biologists will find this a valuable resource and guide for the early years of their scientific careers. Established faculty will find it an essential instructional tool. *Available from:* Customer Services Department, Cambridge University Press, FREEPOST (within the UK), The Edinburgh Building, Cambridge

CB2 1BR, UK, Tel.: +44 (0)1223 325056, Fax: +44 (0)1223 325891. In the US: Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211, USA. In Australia: Cambridge University Press, 10 Stamford Street, Oakleigh, Melbourne 3166, Australia. For further information on textbooks from CUP, please contact Heather Elliot at <hellicott@cup.cam.ac.uk>.

*Dynamics of Tropical Forest Communities*, edited by David M. Newbery, N. Brown and H. H. T. Prins, 648pp., March 1998. Blackwell Scientific Publications, Oxford, UK. ISBN 0 6320 4944 8. Price: Hardback £60.00 + p&p (half-price to members of the British Ecological Society). The proceedings of the 37th Symposium of the British Ecological Society. The book includes 22 in-depth reviews of important areas in tropical ecology. It challenges the dynamic equilibrium idea by arguing for thinking on a timescale of decades to centuries: finding new ways to handle unpredictability and uniqueness; and evaluating species diversity and community change at different scales more critically. The difficult search for more robust generalizations and rules in tropical communities is partly answered by the realization that a new framework and perspective is required for the tropics. There are strong implications for the enhanced conservation and wiser management of tropical resources at both regional and global levels. For more information: Anna Rivers, Blackwell Science, Osney Mead, Oxford OX2 0EL, UK, Tel: +44 1865 206206, Fax: +44 1865 721205.

*An Introduction to Animal Behaviour*, by Aubrey Manning and Marian Stamp Dawkins, 508pp., 1998, 5th Edition. Cambridge University Press, Cambridge. Price: Hardback £55.00 + p&p, paperback £18.95 + p&p. The broad biological approach of this new and updated edition makes it an excellent choice for all students and teachers of animal behaviour and psychology. Contents: Introduction; The development of behaviour; Stimuli and communication; Motivation and decision-making; Learning and memory; Evolution; Social organization. *Available from:* Customer Services Department, Cambridge University Press, freepost (within the UK), The Edinburgh Build-

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ing, Cambridge CB2 1BR, UK, Tel.: +44 (0)1223 325056, Fax: +44 (0)1223 325891. For further information on textbooks from CUP, please contact Heather Elliot at <hellcott@cup.cam.ac.uk>.

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## MEETINGS

**38th Annual Meeting of The Animal Behavior Society**, July 14-20, 2001, Oregon State University, Corvallis Oregon. Symposiums include "Behavioral genetics for the next decade" and "Detecting and measuring mating preferences", and invited paper sessions on the "Song System" and "Aggression and group organization in animal societies". There will also be a Poster session on "Educating in animal behavior." Contact: online through <<http://www.animalbehavior.org/ABS/Program/index.html>>.

**8th International Theriological Congress**, 12-17 August, 2001, Sun City, South Africa. Contacts: ITC 2001 c/o Event Dynamics, PO Box 98009, Sloane Park, 2152 Johannesburg, South Africa. Tel: +27 11 706 5010, e-mail: <[dana@eventdynamics.co.za](mailto:dana@eventdynamics.co.za)>. Web Page: <<http://www.eventdynamics.co.za/itc>>.

**XIII Curso Intensivo Internacional de Manejo Diversificado de Bosques Naturales Tropicales**, 20 Agosto-21 Setiembre 2001, CATIE, Turrialba, Costa Rica. Informes: CATIE 7170, Turrialba, Costa Rica, Tel: (506) 556-2703; Fax: (506) 556-7730 <[www.catie.ac.cr](http://www.catie.ac.cr)>, E-mail: <[dquiros@catie.ac.cr](mailto:dquiros@catie.ac.cr)> or <[capacita@catie.ac.cr](mailto:capacita@catie.ac.cr)>.

**Annual Conference of the American Association of Zoo Veterinarians**, 18-23 September, 2001, Orlando Florida. For more information on the scientific program: Ray Wack, Program Chairman, Sacramento Zoo, 3930 West Land Park Drive, Sacramento, CA 95822-1123, USA, Tel: (916) 264 5887, e-mail: <rfwack@ucdavis.edu>. Conference or membership information: Wilbur Amand, Executive Director/AAZV, 6 North Pennell Road, Media, PA 19063, Tel: (610) 892 4812, Fax: (610) 892 4813, e-mail: <aazv@aol.com>.

**Brazil's International Conference on the Human Dimensions of Global Change**, 6-8 October, 2001. Particular emphasis will be placed on research reports that include a regional or "place-based" perspective and that make a linkage between natural and social sciences, as well as among local, regional and global scales. Plenary themes of the meeting will address the challenges of integration in human dimensions research across disciplines, across hemispheres, and across the science-policy interface. The Open Meeting is being organized by the Brazilian Academy of Sciences, the Inter-American Institute for Global Change Research (IAI), the International Human Dimensions Programme on Global Environmental Change (IHDP), and CIESIN. Information about the meeting, including instructions for the submission of abstracts will be made available at the website <<http://sedac.ciesin.org/openmeeting/>>.

**V Congreso Latinoamericano de Ecología**, 15-19 de Octubre de 2001, Facultad de Ciencias Agrarias, Universidad Nacional de Jujuy, San Salvador de Jujuy, Argentina. La fecha limite de presentación de los resúmenes es el 30 de abril de 2001. Organiza: Facultad de Ciencias Agrarias, Alberdi No. 47, (4600) San Salvador de Jujuy, Argentina, Tel: 54 0388 4221550, 54 0388 4221553, Fax: 54 0388 4221547, e-mail: <vclae@fca.unju.edu.ar>. Web site: <[www.fca.unju.edu.ar](http://www.fca.unju.edu.ar)>.

**V Congresso Brasileiro de Ecologia do Brasil**, 4-9 November, 2001, Porto Alegre, Rio Grande do Sul, Brasil. O tema é "Ambiente x Sociedade". Entidade promotora: Sociedade de Ecologia do

Brasil. Apoio: Universidade Federal do Rio Grande do Sul, Instituto de Biociências, Centro de Ecologia e Departamentos de Ecologia, Zoologia e Botânica. Contatos e correspondência: Organização de Congresso, Rua João Abott, 44- cj.402, 90460-150 Porto Alegre, RS, Brasil, Tel/Fax: + 55 51 333 8737, e-mail: <nossaequipe@nosequipe.com.br>. Web site: <[www.ecologia/ufrgs.br](http://www.ecologia/ufrgs.br)>.

**5<sup>th</sup> International Conference on Environmental Enrichment**, 4-9 November 2001, Taronga Park Zoo, Sydney, Australia. The theme is "Making Enrichment a 21<sup>st</sup> Century Priority". For information: Margaret Hawkins, 51EE Conference Co-ordinator, Taronga Zoo, PO Box 20, Mosman, NSW 2088, Australia, Tel: +61 2 9978 4615, Fax: +61 2 9978 4613, e-mail: <mhawkins@zoo.nsw.gov.au>. Web site: <[www.zoo.nsw.gov.au](http://www.zoo.nsw.gov.au)>.

## 2002

**3rd International Canopy Conference**, June, 2002, Cairns, Australia. Sponsored by the Queensland Government of Australia and the Smithsonian Institution, the conference theme is "Science, Policy and Utilisation" and is intended to bring together scientists, environmental managers and policy makers concerned with the discovery and sustainable use of forests around the world. Contact: Eileen Domagala, e-mail: <Eileen.Domagala@premiers.qld.gov.au>. Web site: <<http://www.premiers.qld.gov.au/whatsnew.htm>>.

**Annual Meetings of the IUCN/SSC Conservation Breeding Specialists Group (CBSG)** 10-13 August, 2002, **The World Zoo Organization (WZO)**, 13-17 August 2002, and **The International Association of Zoo Educators (IZE)**, 17-22 August, 2002, Hofburg Palace, Redoutensäle, Vienna. Hosted by the Schoenbrunn Zoo. For more information: Austropa Inter-convention, Conference Office, Friedrichstrasse 7, A-1010 Vienna, Austria, Fax: +43 1 315 56 50, e-mail: <austropa.congress@verkehrsbuero.at>.



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## NOTES TO CONTRIBUTORS

### Submission

Please send all submissions in English, Portuguese or Spanish to: Jennifer Pervola, Center for Applied Biodiversity Science, Conservation International, 1919 M St. NW, Suite 600, Washington, DC 20036, USA, Tel: (202) 912-1533, Fax: (202) 912-0773, e-mail: <j.pervola@conservation.org>.

### Scope

*Edentata*, the newsletter of the Edentate Specialist Group, aims to provide a basis for conservation information relating to edentates. We welcome texts on any aspect of edentate conservation, including articles, thesis abstracts, news items, recent events, recent publications, and the like.

### Contributions

Manuscripts can be in English, Portuguese or Spanish, and should be double-spaced and accompanied by the text and any tables and/or figures on diskette for PC compatible text editors (MS-Word, Wordperfect, Excel, and Access), and/or emailed to <j.pervola@conservation.org>. Hard copies should be supplied for all figures (illustrations and maps) and tables. The full name and address of each contributing author should be included. Please avoid abbreviations and acronyms without the name in full. Authors whose first language is not English should have their texts carefully reviewed by a native English speaker.

### Articles

A broad range of topics is welcomed and encouraged, including but not limited to: Taxonomy, Systematics, Genetics (when relevant to systematics), Biogeography, Ecology, Conservation, and Behavior. Texts should not exceed 20 pages in length (double-spaced and including the references). For longer articles please include an abstract in English and an optional one in Portuguese or Spanish. Please limit the amount of tables and figures to six, excepting cases where fundamental to the text.

### Figures and Maps

Articles can include small black-and-white photographs, high quality figures, and high quality maps and tables. Electronic files with 300 dpi are acceptable. However, hard copies of photos and maps are preferred. Please keep these to a minimum. We stress the importance of providing maps which are publishable.

### News Items

Please send any information on projects, field sites, courses, recent publications, awards, events, etc.

### References

Examples of house style can be found throughout this newsletter. Please refer to these examples when citing references.

*Journal article.* Carter, T. and Encarnaç o, C. D. 1983. Characteristics and use of burrows by four species of armadillos in Brazil. *J. Mammal.* 64(1) 47-53.

*Chapter in book.* Wetzel, R. M. 1985a. The identification and distribution of recent Xenarthra (Edentata). In: *The Evolution and Ecology of Armadillos, Sloths and Vermilinguas*. G. G. Montgomery (ed.), pp.23-46. Smithsonian Institution Press, Washington, DC.

*Book.* Emmons, L. and Feer, F. 1990. *Neotropical Rainforest Mammals*. A Field Guide. The University of Chicago Press, Chicago.

*Thesis/Dissertation.* Wallace, R. B. 1998. The behavioural ecology of black spider monkeys in north-eastern Bolivia. Doctoral thesis, University of Liverpool, Liverpool, U.K.

*Report.* Muckenhirn, N. A., Mortensen, B. K., Vessey, S., Frazer, C. E. O. and Singh, B. 1975. Report on a primate survey in Guyana. Unpublished report, Pan American Health Organization, Washington, DC.

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# Edentata

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