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News

GIANT ANTEATERS, *MYRMECOPHAGA TRIDACTYLA*: FEEDING BEHAVIOR AND FIRES

One of the most important protected areas in the *cerrado* (bush savanna) of central Brazil is the Serra da Canastra National Park (71,525 ha), in the west of the state of Minas Gerais. It is an extensive plateau, largely composed of open grassland, with altitudes averaging 1,300 m and reaching 1,496 m above sea level. Perhaps one of the most significant features of the park is the community of edentates it protects, including six species of Dasypodidae (*Dasypus novemcinctus*, *D. septemcinctus*, *Cabassous tatouay*, *C. unicinctus*, *Euphractus sexcinctus*, and *Priodontes maximus*) along with the southern tamandua, *Tamandua tetradactyla* and the giant-anteater, *Myrmecophaga tridactyla*. Field research on the armadillos was carried out by Encarnação and Carter (Carter; 1983; Carter and Encarnação, 1983; Encarnação, 1986), and population densities and the feeding behavior of the park's giant anteaters were studied for two months in 1978 by Shaw, Carter and Machado-Neto (1985).

The Park suffers annually from grass fires, and in 1990/91 a study was made of the feeding behavior and diet of the giant anteater during 11 months (March 1990 to May 1991), in order to obtain a

better understanding of their diet (including seasonal variation), and also investigate the possible effects of fires on their foraging behavior (Drumond, 1992). Quantitative data were obtained on dietary items, time spent attacking each nest, and food availability, and these parameters were compared for anteaters foraging in unburnt and recently burnt areas. Censuses were carried out to investigate possible effects of burning on the anteater's foraging. The giant anteater's diet showed seasonal variation in prey selection, and was also evidently determined by different defence mechanisms of the ants (notably *Solenopsis*, *Camponotus* and *Crematogaster*) and termites (mainly Apicotermittinae, Nasutitermittinae and Termitinae) predated. The seasonal effect showed that although Shaw *et al.* (1985) recorded a diet of 88% ants and 12% termites during two months at the end of the wet season (February and March), at other times of the year (for example, April, August and October) termites can make up the majority of their diet. Attacks on nests and galleries were always of very short duration, very rarely lasting more than a minute.

Short term effects of fires were investigated by censuses and observations of foraging behavior in burnt and unburnt areas. They did not avoid recently burnt areas, and there was no evident difference in diet nor prey availability from that observed for intact grassland. The short term effects of, at least light, grass fires would appear to be negligible, probably due to the nests acting as refuges. The anteaters had no problem in finding refuges for themselves during a fire, in swampy areas or forest patches. The effect of fires on the termite and ant communities is undoubtedly, however, complex and significant, and one important factor is the amount of dry biomass available. One would predict that infrequent burns of a larger accumulated biomass may be more damaging than the frequent and light fires typical of most years in the Park.

The study formed part of a Master's degree for the course in Ecology, Conservation and Wildlife Management of the Biological Sciences Institute of the Federal University of Minas Gerais (UFMG), Belo Horizonte. It was supervised by Anthony B. Rylands, Zoology Department, UFMG, supported by the Brazilian Institute for the Environment (Ibama) responsible for the administration of the Park, and financed by Conservation International (CI) - Brazil Program, Belo Horizonte; U.S. Fish and Wildlife Service, Washington, D.C., Fundação Biodiversitas, Belo Horizonte, and the Higher

Education Department (*Coordenação de Aperfeiçoamento de Pessoal de Nivel Superior - CAPES*) of the Ministry of Education, Brazil.

Maria Auxiliadora Drumond, Instituto Estadual de Florestas, Rua Paracatu 304, Barro Preto, Belo Horizonte, 30180-090 Minas Gerais, Brazil, and **Anthony B. Rylands**, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, 31270-901 Minas Gerais, Brazil.

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CONSERVATION ECOLOGY OF ARMADILLOS IN THE CHACO REGION OF ARGENTINA

Applied conservation knowledge and basic ecological research are urgently needed to establish sustainable management programs for South American threatened armadillos, particularly for the giant armadillo (*Priodontes maximus*). In July 1993, we started a long-term, inter-institutional project to (1) analyze population viability of species at risk in subtropical dry forests of the Argentinean Chaco, and (2) propose recommendations for reserve design accordingly. The region harbours the continent's highest diversity of armadillos (10

species out of 20), which includes the giant armadillo and the larger pichi ciego (*Chlamyphorus retusus*) both listed as at risk by IUCN. In the short term, we will establish or verify the species' conservation status. We are currently calibrating line transects of burrows and signs to perform field surveys on a geographical scale, to determine each species' current distribution, relative abundance, and habitat use. As a result, Action Plan-like reports for armadillos will be produced. Additionally, we are estimating the impact of subsistence hunting by rural and native communities.

Preliminary results indicate that (1) the giant armadillo's distribution is diminishing to at least 60% of its historical range in Argentina; (2) armadillo diversity by Chacoan ecoregion does not support the expected diversity according to habitat requirements previously recorded; (3) species are hunted mainly in the winter season, and (4) related to their availability rather than selectively; (5) armadillos rank first or second in the list of the most hunted wildlife species for subsistence throughout the region; and (6) quirquinchos (*Tolypeutes matacus*) and larger multitas (*Dasypus* spp.) account for the bulk (approx. 95%) of captured armadillos.

During 1995-1997, we will monitor selected armadillo species to analyze population viability by estimating demographic (population size, reproductive success, survival rate), and genetic variables (heterozygosity, relatedness). A conservation education program will also be performed in cooperation with regional and federal wildlife management authorities, local NGOs, and the media. Some of these programs have already been initiated.

Institutions/Sponsors: National Council of Scientific Research (CONICET), Buenos Aires (Argentina); Universities of Buenos Aires, San Luis, and Salta (Argentina); Wildlife Boards: Federal (Buenos Aires) and Provincial (Santiago del Estero, Chaco, Formosa) agencies (Argentina); National Park Service (Chaco, Formosa, Buenos Aires, Argentina); State University of New York, Stony Brook (USA); The Fauna and Flora Preservation Society, London (UK).

Project personnel: Main researchers, **Gustavo Zuleta** (project leader) and **Maria Luisa Bolkovic** (Ph.D. candidate). Institutional Address: INEUCI-CONICET, Ciudad Universitaria, Pabellón II, 4° Piso, Buenos Aires, 1428, Argentina. Tel: (54-1)

DISTRIBUTION AND CONSERVATION STATUS OF THE THREE-BANDED ARMADILLO

Ilmar Santos recently completed his thesis on the distribution and conservation status of the three banded armadillo *Tolypeutes tricinctus* in partial fulfillment of the requirements for the Master's course in Ecology, Conservation and Wildlife Management of the Federal University of Minas Gerais (UFMG), Brazil. The study was supervised by Dr Gustavo A. B. da Fonseca (UFMG). It was supported by the U. S. Fish and Wildlife Service (USFWS), World Wildlife Fund (WWF), Conservation International (CI), The John D. and Catherine T. MacArthur Foundation, and Fundação Biodiversitas.

The three-banded armadillo is endemic to the northeastern region of Brazil and is categorized as "indeterminate" by IUCN. During the study, Santos gave emphasis to the diet, home range, geographical distribution, and conservation status of the species. The field work was carried out in the period of November, 1990 to March, 1991. The food habits of the species was examined through the analysis of feces collected in the study area. The data on home range and activity patterns were obtained by radiotracking four individuals equipped with a transmitter. Information on the present geographic distribution was collected through interviews made with local people in 338 localities. With regard to the home range, the data suggest that the species uses an area comparable to that of other bigger Dasypodidae. *T. tricinctus* behaved as a nocturnal species, and its diet was composed of insects, fruits and small vertebrates. Results obtained indicate that *T. tricinctus*, formerly abundant in the surveyed region, is now found in restricted populations in regions of low human density that still have significant areas of natural habitat. Short and long term measures for protection and management of the species in its habitat and in captivity were also outlined.

Reference

Santos, I. B. 1993. *Bionomia, distribuição geográfica e situação atual do tatu-bola Tolypeutes tricinctus (Linné, 1758) (Dasypodidae, Mammalia), no Nordeste do Brasil*. Master's thesis. Instituto de Ciências

LIVRO VERMELHO DOS MAMÍFEROS BRASILEIROS AMEAÇADOS

A Fundação Biodiversitas publica no mês de janeiro o *Livro Vermelho dos Mamíferos Brasileiros Ameaçados de Extinção*, editado por Gustavo A. B. da Fonseca, Anthony B. Rylands, Cláudia M. R. Costa, Ricardo B. Machado e Yuri L. R. Leite. O livro é composto por capítulos que contemplam cada uma das cinquenta e oito espécies de mamíferos citadas na *Lista Oficial de Espécies da Fauna Brasileira Ameaçada de Extinção* do Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis (Ibama). Cada capítulo contém informações sobre a distribuição, população, aspectos biológicos e ecológicos da espécie, as principais ameaças à sua sobrevivência, estratégias de conservação e ocorrência em unidades de conservação. A publicação é financiada pelo Fundo Mundial para a Natureza (WWF), Conservation International (CI) e Fundação MacArthur.

WORKSHOP: PRIORITY AREAS FOR THE CONSERVATION OF THE NORTHEASTERN ATLANTIC FOREST

Organized by Conservation International, Fundação Biodiversitas and the Sociedade Nordestina de Ecologia (SNE), the "Workshop for the Definition of Priority Areas for the Conservation of the Northeastern Atlantic Forest" was held on the Island of Itamaracá, Recife, Pernambuco, during the period of December 6th to 10th, 1993.

Experts of many areas, including mammals, birds, reptiles, amphibians, fish, invertebrates, plants and socio-economics, met to define the areas of relevant interest for the bioma's conservation. Each expert received a set of previously compiled maps and documents, concerning the existing forest fragments, protected areas, vegetation, scientific understanding and species' richness for the groups involved, as well as social and economic data such as demographic density, population growth and land use. Besides these data, the participants were able to use a data center set up at the workshop. Four PC compatible computers (486 DX2) were operating together with the Geographic

Information System developed by CI (CISIG) that handle the majority of the information generated. In a second phase, the various proposals were combined for the elaboration of a final map of the priority areas.

As follow up to the workshop, the magnetic format data base will be published in the near future. This will comprise basic thematic maps, applied bibliography, a technical report on the event and the data base on the species of interest for conservation.

Recent Publications

The Environmental Impact of Burrowing Animals and Animal Burrows, edited by Peter S. Meadows and Azra Meadows, 1992. Symposia of the Zoological Society of London, no. 63, 386 pages, halftones, figures, tables, Clarendon Press/The Zoological Society of London. Hdbk £45. This volume examines the impact of burrowing animals on the environment, over a wide range of taxa paying equal attention to terrestrial and aquatic habitats. The scale and importance of animal burrowing are made clearer than ever before by the contributions to this symposium. Available from Jane Pennington, SMJ Marketing, OUP Walton Street, Oxford OX2 6DP, UK. Fax: +44-865-56767

Mammal Species of the World: A Taxonomic and Geographic Reference, 2nd edition, edited by Don E. Wilson and DeeAnn M. Reeder, Smithsonian Institution Press, Washington, D.C., 1993, 1226 pp. Hdbk £ 63.50. A revised edition of Honacki's work, first published in 1982. It provides the definitive source for names, ranges, and synonyms for each of the world's 4,500+ mammal species. Entries for each taxon, genus, and species are arranged in a checklist with scientific name and authority, dates, locality, geographic distribution, conservation status, complete list of synonyms, and comments. The new edition includes 126 new species described since the 1982 edition. Available from: Natural History Book Service Ltd., 2-3 Wills Road, Totnes, Devon TQ9 5XN, UK. Fax; 44-803-865280.

Distance Sampling: Estimating Abundance of Biological Populations, by S. T. Buckland, D. R. Anderson, K. P. Burnham, and J. L. Laake, 1993, 464 pp. Chapman and Hall Ltd., Andover, UK.

Price Hdbk £ 40.00, Pbk £ 19.95. An extremely important reference for population survey methods for mammals. Contents: Introductory concepts. Assumptions and modelling philosophy. Statistical theory. Line transects. Point transects. Extensions and related work. Study design and field methods. Illustrative examples. Information: Direct Response Supervisor, Chapman and Hall Ltd., Cheriton House, North Way, Andover, Hants SP10 5BE, England.

Creative Conservation: Interactive Management of Wild and Captive Animals, edited by G. Mace, P. J. Olney, and A. Feistner, Chapman and Hall, London, November 1993, 400 pp. Hdbk c. £ 45.00 + postage £ 3.50 in UK and surface mail overseas, air mail £ 9.50. The relationship between breeding endangered species in captivity and the support needed to ensure the survival of the species in the wild is crucial to the long term success of conservation programs. This book discusses how the captive breeding community relates to work in the field, what is being done to help species and their habitats survive, and how to contribute in the future. The book is the result of the deliberations and presentations of the 6th World Conference on Breeding Endangered Species in Captivity: The Role of Zoos in Global Conservation, hosted by the Jersey Wildlife Preservation Trust, Jersey, in May 1992, and presents a full review of the biological, logistical, political and economic concerns that affect all efforts to manage populations. Future objectives are presented, and pertinent case studies illustrate the successes and frustrations encountered - a major contribution to the debate on the interactive management of threatened species. In five parts: 1) Introduction. Past progress and future challenges - R. J. Wheater; 2) General Issues; 3) Reintroduction and Captive Breeding; 4) Species Examples; 5) Regional Approaches and; 6) Concluding Remarks - G. Rabb. Available from: Antonia Sharpe, Chapman and Hall, 2-6 Boundary Row, London SE1 8HN, UK. Fax: (071) 522-9623.

GIS Applications in Mammalogy, edited by Suzanne B. McLaren and Janet K. Braun, 1993, 41 pp. Oklahoma Museum of Natural History, Norman, Oklahoma. Includes the following chapters: Introduction - S. B. McLaren and J. M. Briggs; The application of GIS to mammalogy: basic concepts - J. K. Berry; GIS in mammalogy: building a database - P. V. August; Ecological analyses using geographic information systems - L. B. Johnson; Glossary - P. V. August, J. M. Briggs, L. B. Johnson and S. B. McLaren. Available from: Oklahoma Museum of Natural History, 1335 Asp

Avenue, Norman, Oklahoma 73019, USA.

1993 Global Zoo Directory, edited by Frederick B. Swengel, published by the Captive Breeding Specialist Group (CBSG) in collaboration with the International Species Information System (ISIS) and *International Zoo Yearbook*, 1993. A remarkable and valuable compendium featuring: Directory of Zoos of the World (mailing and telephone information for about 1,800 zoos), Regional Conservation Coordinators, International Studbook listing, Regional Studbook listing, Species Programs, Taxon Advisory Groups, Conservation Assessment and Management Plans (CAMPs), SSC Specialist Groups, SSC Action Plans, SSC Specialist Group addresses, and CBSG member addresses (more than 575 people in 57 countries). Price US\$35.00, postage paid. Contact: Global Zoo Directory, c/o CBSG, 12101 Johnny Cake Ridge Road, Apple Valley, MN 55124, USA.

Meetings

67th Meeting of the Species Survival Commission, 15-17 January 1994, Buenos Aires, Argentina. Organizers: World Conservation Union (IUCN). Contact: Coordinadora logística de la Asamblea General, IUCN, Rue Mauverney 28, CH-1196 Gland, Switzerland. Tel: 41 22 999 0001, Fax: 41 22 999 0020.

XIX Session of the IUCN General Assembly, 18-26 January 1994, Buenos Aires, Argentina. Organizers: World Conservation Union (IUCN). Contact: Coordinadora logística de la Asamblea General, IUCN, Rue Mauverney 28, CH-1196 Gland, Switzerland. Tel: 41 22 999 0001, Fax: 41 22 999 0020.

XX Congresso Brasileiro de Zoologia, 24-29 de julho de 1994, Universidade Federal do Rio de Janeiro, Rio de Janeiro. A temática a ser abordada está baseada na questão: "Os Rumos da Zoologia". Neste contexto serão abordados os aspectos referentes a Sistemática, pesquisa básica e aplicada, filosofia e história de zoologia, coleções, publicações e a ética na zoologia. As políticas referentes às legislações ambientais, áreas de proteção e espécies ameaçadas de extinção, terão espaços em mesas redondas e/ou conferências. O Comitê Organizador aguarda sugestões de todos os zoólogos no desenvolvimento de outros subtemas que poderão ser encaminhados até 30 outubro de

1993. Envio de resumos até 30 de novembro de 1993. Informações: Secretaria do XX CBZ, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Ilha do Fundão, 21949-900 Rio de Janeiro, Rio de Janeiro, Brasil. Tel: (021) 280-7993, 590-9522 r.343 ou 340, Fax: (021) 280-7993.

4th International Congress of Vertebrate Morphology, 31 July-4 August 1994, Chicago. Contact: Dr Susan Herring, Chair, ICVM Organizing Committee, Department of Orthodontics SM-46, University of Washington, Seattle, Washington 98195, USA, Tel: (206) 543-3203, Fax: (206) 685-8163.

Contributions

We would be most grateful if you could send us information on projects, research groups, events (congresses, symposia, and workshops), recent publications, news items or opinions of recent events and suchlike, either in the form of manuscripts (double-spaced) or in diskettes for PC compatible text-editors (MS-Word, Wordperfect, Wordstar). Articles, not exceeding six pages, can include small black-and-white photographs, figures, maps, tables and references, but please keep them to a minimum.

Please send contributions to the editors: **Gustavo A. B. da Fonseca**, Conservation International, Avenida Antônio Abrahão Caram 820/302, Pampulha, 31275-000 Belo Horizonte, MG, Brazil, Fax: (031)441-2582 or **Yuri L. R. Leite / Ilmar B. Santos**, Fundação Biodiversitas, Rua Maria Vaz de Melo, 71, Dona Clara, 31260-110 Belo Horizonte, Minas Gerais, Brazil, Fax (031)441-7037, email: cpcb@ax.apc.org.

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