The Charismatic Giant Anteater (*Myrmecophaga tridactyla*): A Famous John Doe?

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SHORT COMMUNICATION

The charismatic giant anteater (*Myrmecophaga tridactyla*): a famous John Doe?

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Abstract Species conservation depends on biological knowledge. This study evaluates the current level of scientific knowledge of the giant anteater (*Myrmecophaga tridactyla*). We conducted a bibliographic search in Web of Science and in Edentata and recovered 81 articles related to the species, scattered throughout 47 journals. Ecology represents the most studied research theme (25 articles) and only 12 articles focus on conservation. There are more *in situ* (48 articles) than *ex situ* (32 articles) studies. The small number of conservation articles is cause of concern. Unfortunately the lack of basic knowledge may be one of the reasons hampering the implementation of conservation studies.

Keywords: giant anteater, *Myrmecophaga tridactyla*, scientometrics

O carismático tamanduá-bandeira (*Myrmecophaga tridactyla*): um famoso João Ninguém?

Resumo Conservar espécies depende do conhecimento sobre as mesmas e suas relações com o ambiente. Avaliamos o nível do conhecimento científico sobre o tamanduá-bandeira (*Myrmecophaga tridactyla*). Realizamos uma pesquisa bibliográfica no Web of Science e na Edentata e obtivemos 81 artigos, distribuídos em 47 periódicos. Ecologia é o tema mais estudado (25 artigos) e apenas 12 artigos abordaram a conservação da espécie. Existem mais estudos *in situ* (48 artigos) do que *ex situ* (32 artigos). O pequeno número de artigos sobre conservação da espécie é motivo de preocupação. Infelizmente, a falta de conhecimentos biológicos básicos pode ser um limitante na conservação desta espécie.

Palavras-chave: cienciometria, *Myrmecophaga tridactyla*, tamanduá-bandeira

The current biodiversity crisis is one of the forefront issues in conservation biology (Singh, 2002). A global review of the conservation status of mammals shows that 25% of all known species are listed as threatened by extinction (Schipper *et al*., 2008). Besides that, mammal population losses predict that more mammal species are likely to decline (Ceballos & Ehrlich, 2002; Yackulic *et al*., 2011). Biological knowledge on organisms is of utmost importance in attempts to halt population declines (Greene, 2005). Unfortunately, it seems that academic interest in mammal natural history and basic biology is dwindling (Schmidly, 2005; Hafner, 2007; Weigl, 2009; Cotterill & Foissner, 2010). Since current conservation spotlight is skewed towards charismatic species (*e.g*., Walpole & Leader-Williams, 2002; Home *et al*., 2009), one might expect that such species are better known by scientists than non-charismatic species (Amori & Gippoliti, 2000). However, this general trend might not hold true for particular species and/or regions (*e.g*., Brito *et al*., 2009).

In order to tackle with this issue, we use the giant anteater (*Myrmecophaga tridactyla*) as a case study to evaluate the current level of scientific biological knowledge of a charismatic Neotropical species. The giant anteater is a good model for our analysis, since it is charismatic and listed as threatened (under the category Vulnerable), and its population declines are particularly worrisome (IUCN, 2012).

We conducted a bibliographic search in Thomson's ISI Web of Science (<http://portal.

isiknowledge.com>) and in the journal Edentata, using as keywords the scientific (*Myrmecophaga tridactyla*) or the common name (giant anteater) of our focus species. We included in our analyses all articles published between 1957 and 2011. For each article, we collected the following data: (a) year of publication; (b) journal where the article was published; (c) country where the study was conducted (for articles that were based on fieldwork); (d) country of author affiliation; (e) research theme (anatomy, biochemistry, conservation, ecology, ethology, evolution, genetics, histology, microbiology, parasitology, veterinary, zoology); and (f) if the research had an *in situ* (fieldwork) or an *ex situ* (*e.g.*, zoos, captive populations) approach.

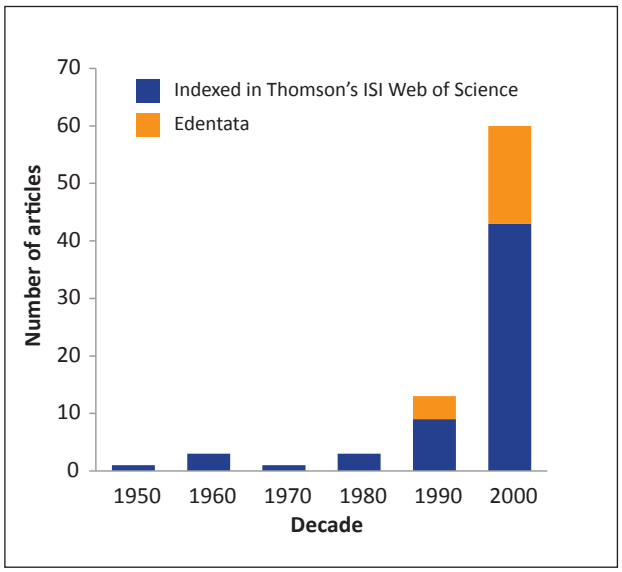

FIGURE 1. Total number of articles on giant anteater (*Myrmecophaga tridactyla*) biology published in journals indexed in Thomson's ISI Web of Science (<http://portal.isiknowledge.com>) and in Edentata per decade.

Our search recovered 81 articles on the giant anteater published between 1957 and 2011 (a mean value of 1.5 articles per year throughout the period) (see **APPENDIX 1** for a list of articles retrieved in our bibliographic search). It is noticeable that there is an increase of articles across time with the majority of publications targeting the species originating in the last decade (**FIG. 1**). The giant anteater was the focus of research in 54 articles (single-species articles), while it was a secondary objective present in broader-approach articles (*e.g.*, multi-species articles on mammals) in 27 articles. The articles on giant anteater biology are scattered throughout 46 different journals indexed in Thomson's ISI Web of Science plus Edentata (**FIG. 2**). Only eight journals published more than one article focusing on the species, concentrating 52% of all published articles in these few periodicals (**FIG. 2**). The majority of studies on giant anteaters were conducted in Brazil (both *in situ* and *ex situ* studies) and the USA (*ex situ* studies) (**FIG. 3**).

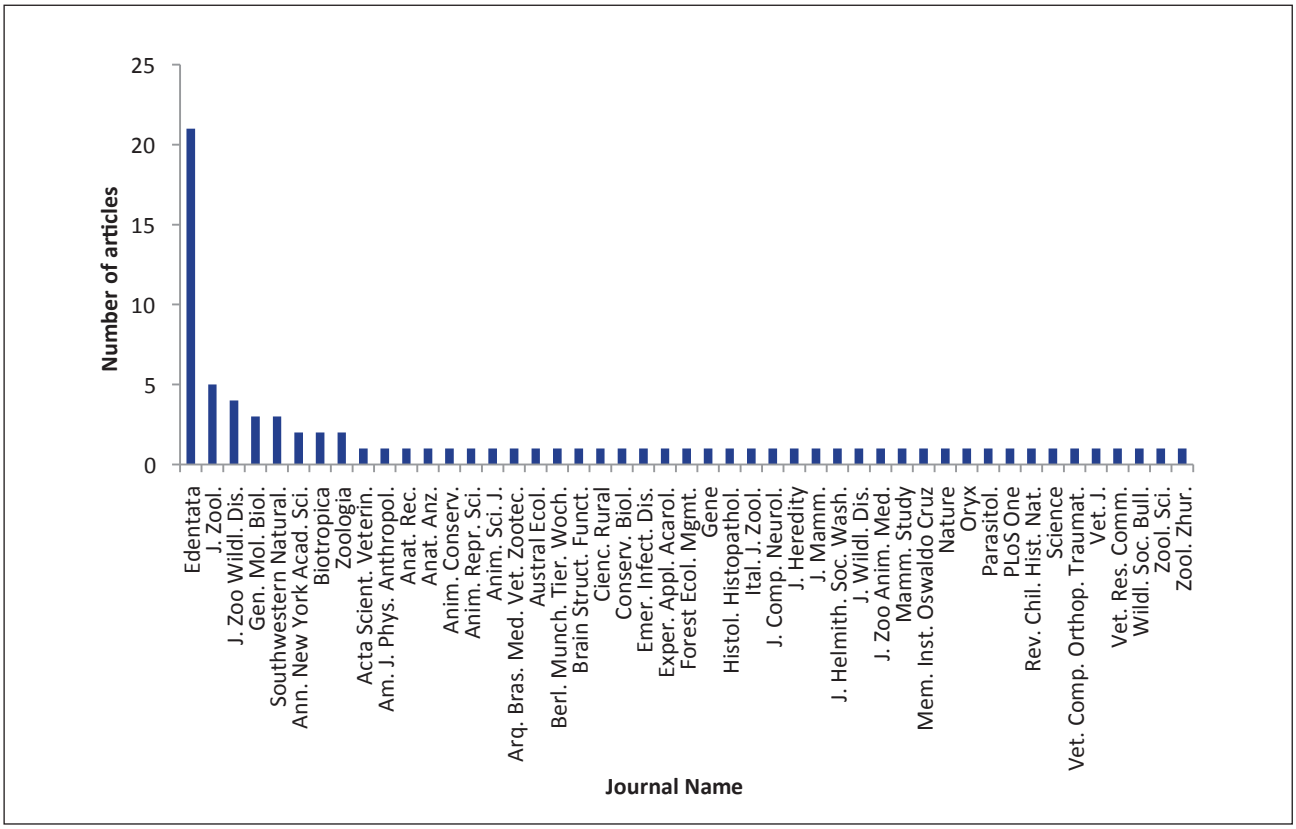

FIGURE 2. Number of journals indexed in Thomson's ISI Web of Science plus Edentata that have published articles on giant anteater (*Myrmecophaga tridactyla*) biology.

The majority of researchers working with the species are also affiliated to institutions located in Brazil and the USA (**Fig. 4**). Ecology and anatomy are the research themes that accumulate more articles (**Fig. 5**). A total of ten articles deal with conservation of the giant anteater (**Fig. 5**). There are 44 articles focusing on giant anteaters in the wild (*in situ*), 28 articles on *ex situ* research (captive breeding, zoos, museums), and three articles both with *in situ* and *ex situ* issues.

It is surprising that the overall knowledge for such a charismatic species is not that comprehensive. Even though our results show a wide array of themes, there are relatively few articles for each area of knowledge (**Fig. 5**). Besides that, even though the giant anteater is a widespread species in the Neotropics (IUCN, 2012), *in situ* studies cover only a small number of sites/populations (**Table 1**) and suggest that current knowledge is not necessarily

Table 1. A list of sites that have been the target of *in situ* studies on giant anteater (*Myrmecophaga tridactyla*) biology. See Appendix 1 for complete citations.

In situ research site	Coordinates	References
Embrapa Pantanal, Nhumirim, Brazil	18°59'S; 56°39'W	Mourão & Medri (2002)
	18°59'S; 56°39'W	Medri (2003a;b)
	18°59'S; 56°39'W	Rodrigues *et al*. (2003)
	18°59'S; 56°39'W	Medri & Mourão (2005)
	18°59'S; 56°37'W	Camilo-Alves & Mourão (2006)
	18°59'S; 56°39'W	Rocha & Mourão (2006)
	18°59'S; 56°39'W	Mourão & Medri (2007)
	18°59'S; 56°39'W	Desbiez & Medri (2010)
Emas National Park, Brazil	18°19'S; 52°45'W	Redford (1985)
	18°19'S; 52°45'W	Silveira *et al*. (1999)
	Not informed	Bechara *et al*. (2002)
	18°19'S; 52°45'W	Sanderson & Silveira (2003)
	Not informed	Lima *et al*. (2004)
	18°18'S; 52°54'W	Garcia *et al*. (2005)
	18°15'S; 52°53'W	Collevatti *et al*. (2007)
	Not informed	Vynne *et al*. (2009)
Roraima, Brazil	02°49'N; 60°39'W	Kreutz *et al*. (2009)
Rio das Mortes Xavante Reserve, Brazil	Not informed	Leeuwenberg (1987)
	Not informed	Prada & Marinho-Filho (2004)
Bragança, Brazil	Not informed	Barros *et al*. (2003)
Brasília National Park, Brazil	15°35'S; 48°05'W	Lacerda *et al*. (2009)
Serra da Canastra National Park, Brazil	20°20'S; 46°38'W	Shaw *et al*. (1987)
Jaguariaíva, Brazil	24°15'S; 49°42'W	Braga *et al*. (2010)
Noël Kempff Mercado National Park, Bolivia	14°33'S; 60°55'W	Emmons *et al*. (2004)
Bosawas Biosphere Reserve, Nicaragua	18°30'S; 84°59'W	Koster (2008)
Rio Plátano Biosphere Reserve, Honduras	14°44'S; 84°40'W	McCain (2002)
Honduras	*a*	Portillo *et al*. (2010)

a: Portillo *et al*. (2010) reviewed the occurrence of giant anteater in Honduras and provided several point localities with coordinates where the species was recorded within the country.

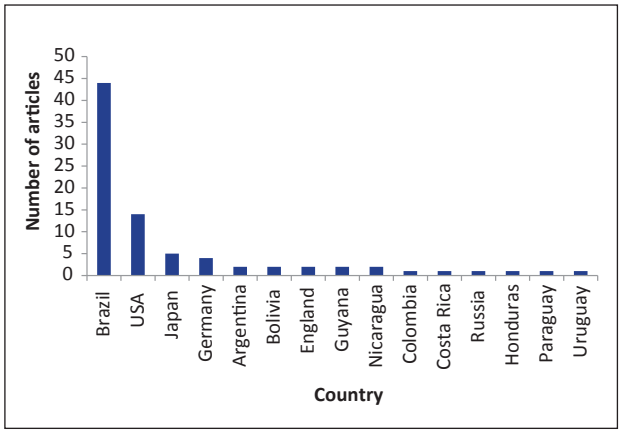

FIGURE 3. Countries where research on giant anteater (*Myrmecophaga tridactyla*) biology was conducted.

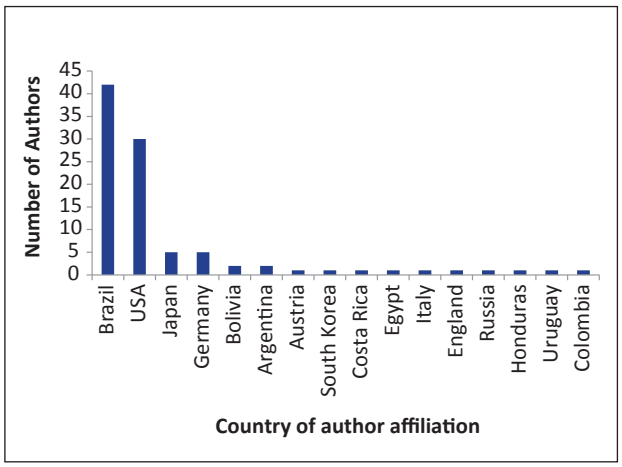

FIGURE 4. Number of authors working on giant anteater (*Myrmecophaga tridactyla*) biology per country of affiliation.

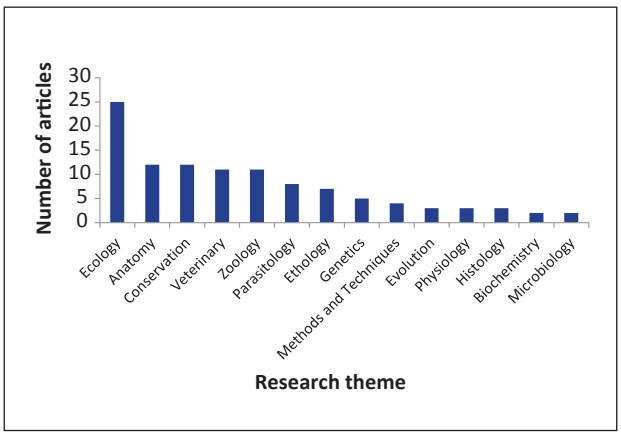

FIGURE 5. Number of articles on giant anteater (*Myrmecophaga tridactyla*) biology per research theme.

representative of the species as a whole. This might be a problem as giant anteater populations are declining throughout the species range (IUCN, 2012). The absolute number of articles focusing on the conservation of the giant anteater is still low in the face of the conservation status of this charismatic species. It seems that the idea that charismatic species are well-known by science does not hold true for the giant anteater, making it is a famous John Doe of wildlife conservation.

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REFERENCES

Amori, G. & S. Gippoliti. 2000. What do mammalogists want to save? Ten years of mammalian conservation biology. Biodiversity and Conservation 9: 785–793.

Brito, D., L. C. Oliveira, M. Oprea & M. A. R. Mello. 2009. An overview of Brazilian mammalogy: trends, biases and future directions. Zoologia 26: 67–73.

Ceballos, G. & P. R. Ehrlich. 2002. Mammal population losses and the extinction crisis. Science 296: 904–907.

Cotterill, F. P. D. & W. Foissner. 2010. A pervasive denigration of natural history misconstrues how biodiversity inventories and taxonomy underpin scientific knowledge. Biodiversity and Conservation 19: 291–303.

Greene, H. W. 2005. Organisms in nature as a central focus for biology. Trends in Ecology and Evolution 20: 23–27.

Hafner, M. S. 2007. Field research in mammalogy: an enterprise in peril. Journal of Mammalogy 88: 1119–1128.

Home, R., C. Keller, P. Nagel, N. Bauer & M. Hunziker. 2009. Selection criteria for flagship species by conservation organizations. Environmental Conservation 36: 139–148.

IUCN. 2012. The IUCN Red List of threatened species 2012.1. International Union for the Conservation of Nature and Natural Resources. <http://www.iucnredlist.org/>. Downloaded on 30 August 2012.

Schipper, J. *et al*. 2008. The status of the world's land and marine mammals: diversity, land and knowledge. Science 322: 225–230.

Schmidly, D. J. 2005. What it means to be a naturalist and the future of natural history at American universities. Journal of Mammalogy 86: 449–456.

Singh, J. S. 2002. The biodiversity crisis: a multifaceted review. Current Science 82: 638–647.

Walpole, M. J. & N. Leader-Williams. 2002. Tourism and flagship species in conservation. Biodiversity and Conservation 11: 543–547.

Weigl, P. D. 2007. The natural history conundrum revisited: mammalogy begins at home. Journal of Mammalogy 90: 265–269.

Yackulic, C. B., E. W. Sanderson & M. Uriarte. 2011. Anthropogenic and environmental drivers of modern range loss in large mammals. Proceedings of the National Academy of Sciences USA 108: 4024–4029.

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Appendix 1. List of published scientific literature on giant anteater (*Myrmecophaga tridactyla*) biology.

Araujo, M. S., M. Ciuccio, A. V. Cazon & E. B. Casanave. 2010. Differentiation of Xenarthra (Mammalia) species through the identification of their fecal bile acid patterns: An ecological tool. Revista Chilena de Historia Natural: 557–566.

Barros, M., I. Sampaio & H. Schneider. 2003. Phylogenetic analysis of 16S mitochondrial DNA data in sloths and anteaters. Genetics and Molecular Biology 26: 5–11.

Bartmann, C. P., C. Beyer & H. Wissdorf. 1991. Topography of the organs of the pelvic cavity and macroscopic and histologic findings of the sex organs of a male giant anteater (*Myrmecophaga tridactyla*) with regard to fertility. Berliner und Münchener Tierärztliche Wochenschrift 104: 41–46.

Bechara, G.H., M. P. J. Szabó, W. V. Almeida-Filho, J. N. Bechara, R. J. G. Pereira, J. E. Garcia & M. C. Pereira. 2002. Ticks associated with armadillo *Euphractus sexcinctus* and anteater *Myrmecophaga tridactyla* of Emas National Park, state of Goiás, Brazil. Annals of the New York Academy of Science 969: 290–293.

Braga, F. G., R. E. F. Santos & A. C. Batista. 2010. Marking behavior of the giant anteater *Myrmecophaga tridactyla* (Mammalia: Myrmecophagidae) in southern Brazil. Zoologia 27: 7–12.

Brainard, B. M., A. Newton, K. C. Hinshaw & A. M. Klide. 2008. Tracheostomy in the giant anteater (*Myrmecophaga tridactyla*). Journal of Zoo and Wildlife Medicine 39: 655–658.

Brooks, D. M. 1995. Distribution and limiting factors of edentates in the Paraguayan Chaco. Edentata 2: 10–15.

Cáceres, N. 2011. Biological characteristics of mammals influence road kill in an Atlantic Forest-Cerrado interface in south-western Brazil. Italian Journal of Zoology 78: 379–389.

Camilo-Alves, C. de S. P. & G. Mourão. 2006. Responses of a specialized insectivorous mammal (*Myrmecophaga tridactyla*) to variation in ambient temperature. Biotropica 38: 52–56.

Carregaro, A. B., P. M. Gerardi & D. K. Honsho. 2009. Allometric scaling of chemical restraint associated with inhalant anesthesia in giant anteaters. Journal of Wildlife Diseases 45: 547–551.

Cavalcanti, S. M. C. & E. M. Gese. 2010. Kill rates and predation patterns of jaguars (*Panthera onca*) in the southern Pantanal, Brazil. Journal of Mammalogy 91: 722–736.

Coke, R. L., J. W. Carpenter, T. Aboellail, L. Armbrust & R. Isaza. 2002. Dilated cardiomyopathy and amebic gastritis in a giant anteater (*Myrmecophaga tridactyla*). Journal of Zoo and Wildlife Medicine 33: 272–279.

Collevatti, R. G., K. C. E. Leite, G. H. B. Miranda & F. H. G. Rodrigues. 2007. Evidence of high inbreeding in a population of the endangered giant anteater, *Myrmecophaga tridactyla* (Myrmecophagidae), from Emas National Park, Brazil. Genetics and Molecular Biology 30: 112–120.

Cutolo, A. A., M. B. Labruna, F. B. Tonin & I. F. Sartor. 2000. *Amblyomma calcaratum* parasitizing giant anteater (*Myrmecophaga tridactyla*) in the state of São Paulo. Arquivo Brasileiro de Medicina Veterinária e Zootecnia 52: 152–153.

Dahroug, M. A. A., N. C. M. R. Turbino, L. D. Guimarães, C. H. da S. Justino & R. L. de Souza. 2009. Stabilization of radius and ulna fractures in a giant anteater (*Myrmecophaga tridactyla*). Acta Scientiae Veterinariae 37: 65–68.

Dantas-Torres, F., D. R. Ferreira, L. M. de Melo, P. A. Lima, D. B. Siqueira, L. C. Rameh-de-Albuquerque, A. V. de Melo & J. A. Ramos. 2010. Ticks on captive and free-living wild animals in northeastern Brazil. Experimental and Applied Acarology 50: 181–189.

Desbiez, A. L. J. & I. M. Medri. 2010. Density and habitat use by giant anteaters (*Myrmecophaga tridactyla*) and southern tamanduas (*Tamandua tetradactyla*) in the Pantanal wetland, Brazil. Edentata 11: 4–10.

Diniz, L. S. M., E. O. Costa & P. M. A. Oliveira. 1995. Clinical disorders observed in anteaters (Myrmecophagidae, Edentata) in captivity. Veterinary Research Communications 19: 409–415.

Emmons, L. H., L. P. Flores, S. A. Alpirre & S. J. Swarner. 2004. Bathing behavior of giant anteaters (*Myrmecophaga tridactyla*). Edentata 6: 41–43.

Endo, H., T. Komiya, S. Kawada, A. Hayashida, J. Kimura, T. Itou, H. Koie & T. Sakai. 2009. Three-dimensional reconstruction of the xenarthrous process of the thoracic and lumber vertebrae in the giant anteater. Mammal Study 34: 1–6.

Endo, H., N. Niizawa, T. Komiya, S. Kawada, J. Kimura, T. Itou, H. Koieand & T. Sakai. 2007. Three-dimensional CT examinations of the mastication system in the giant anteater. Zoological Science 24: 1005–1011.

Fallabrino, A. & E. Castiñeira. 2006. Situación de los edentados en Uruguay. Edentata 7: 1–3.

Fernandes. T. N. & R. J. Young. 2008. Fluctuations in the tympanic membrane temperatures of non-restrained captive giant anteaters and southern tamanduas. Journal of Zoology 274: 94–98.

Ferrigno, C. R. A., F. Futema, D. L. Fedullo, V. Kiyan, D. T. Fantoni, D. C. B. Baccarin & M. A. Romano. 2003. Treatment of radius, ulna and humerus fractures with the aid of a bone morphogenetic protein in a giant anteater (*Myrmecophaga tridactyla*). Veterinary and Comparative Orthopaedics and Traumatology 16: 196–199.

Gambaryan, P. P. 2002. Ways of adaptive changes in claws of digging mammals. Zoologicheskii Zhurnal 81: 978–990.

Garcia, J. E., L. A. Vilas Boas, M. V. F. Lemos, E. G. M. Lemos & E. P. B. Contel. 2005. Identification of microsatellite DNA markers for the giant anteater *Myrmecophaga tridactyla*. Journal of Heredity 96: 600–602.

Gardner, S. L., S. J. Upton, C. R Lambert & O. C. Jordán. 1991. Redescription of *Eimeria escomeli* (Rastegaieff, 1930) from *Myrmecophaga tridactyla*, and a first report from Bolivia. Journal of the Helminthological Society of Washington 58: 16–18.

Haga, I. R., S. S. Martins, S. T. Hosomi, F. Vicentini, H. Tanaka & M. S. Gatti. 1999. Identification of a bisegmented double-stranded RNA virus (Picobirnavirus) in faeces of giant anteaters (*Myrmecophaga tridactyla*). Veterinary Journal 158: 234–236.

Kaelber, W. W. 1966. Nuclear configuration of the diencephalon of *Tamandua tetradactyla* and *Myrmecophaga jubata*. Journal of Comparative Neurology 128: 133–169.

Koster, J. M. 2008. Giant anteaters (*Myrmecophaga tridactyla*) killed by hunters with dogs in the Bosawas Biosphere Reserve, Nicaragua. The Southwestern Naturalist 53: 414–416.

Kreutz, K., F. Fischer & K. E. Linsenmair. 2009. Observations of intraspecific aggression in giant anteaters *Myrmecophaga tridactyla*. Edentata 8–10: 6–7.

Kubota, K., J. Kubota, N. Fukuda & S. Asakura. 1962. Comparative anatomical and neurohistological observations on the tongue of the great anteater (*Myrmecophaga Jubata* Linne). Anatomical Record 143: 15–25.

Labruna, M. B., C. D. de Paula, T. F. Lima & D. A. Sana. 2002. Ticks (Acari: Ixodidae) on wild animals from the Porto-Primavera hydroelectric power station area, Brazil. Memórias do Instituto Oswaldo Cruz 97: 1133–1136.

Lacerda, A. C. R., W. M. Tomas & J. Marinho-Filho. 2009. Domestic dogs as an edge effect in the Brasília National Park, Brazil: interactions with native mammals. Animal Conservation 12: 477–487.

Leeuwenberg, F. 1997. Edentata as a food resource: subsistence hunting by Xavante Indians. Edentata 3: 4–5.

Leiva, M. & M. C. Marques. 2010. Dados reprodutivos da população cativa de Tamanduá-Bandeira (*Myrmecophaga tridactyla* Linnaeus, 1758) da Fundação Parque Zoológico de São Paulo. Edentata 11: 49–52.

Liang-Sheng, Y. 1957. On a filarial parasite, *Deraiophoronema freitaslenti* n.sp., from the giant anteater, *Myrmecophaga tridactyla* from British Guiana, and a proposed reclassification of Dipetalonema and related genera. Parasitology 47: 196–205.

Lima e Silva, M. F., M. P. J Szabó & G. H. Bechara. 2004. Microscopic features of tick-bite lesions in anteaters and armadillos: Emas National Park and the Pantanal region of Brazil. Annals of the New York Academy of Sciences 1026: 235–241.

McAdam, D. W. & J. S. Way. 1967. Olfactory discrimination in the giant anteater. Nature 214: 316–317.

McCain, C. M. 2001. First evidence of the giant anteater (*Myrmecophaga tridactyla*) in Honduras. The Southwestern Naturalist 46: 252–254.

Medri, I. M. 2005. A brief note on the sleeping habits of the giant anteater – *Myrmecophaga tridactayla* Linnaeus (Xenarthra, Myrmecophagidae). Revista Brasileira de Zoologia 22: 1213–1215.

Medri, Í. M. & G. Mourão. 2005. Home range of giant anteaters (*Myrmecophaga tridactyla*) in the Pantanal wetland, Brazil. Journal of Zoology 206: 265–275.

Medri, Í. M., G. Mourão & A. Y. Harada. 2003. Dieta de tamanduá-bandeira (*Myrmecophaga tridactyla*) no Pantanal da Nhecolândia, Brasil. Edentata 5: 29–34.

Meyer, W., C. Beyer & H. Wissdorf. 1993. Lectin histochemistry of salivary glands in the giant ant-eater (*Myrmecophaga tridactyla*). Histology and Histopathology 8: 305–316.

Meyers, M. A. 2003. Giant anteater (*Myrmecophaga tridactyla*) diet survey. Edentata 5: 20–24.

Mourão, G. & Í. M. Medri. 2002. A new way of using inexpensive large-scale assembled GPS to monitor giant anteaters in short time intervals. Wildlife Society Bulletin 30: 1029–1032.

Mourão, G. & Í. M. Medri. 2007. Activity of a specialized insectivorous mammal (*Myrmecophaga tridactyla*) in the Pantanal of Brazil. Journal of Zoology 271: 187–192.

Mutlow, A. G., M. W. Dryden & P. A. Payne. 2006. Flea (*Pulex simulans*) infestation in captive giant anteaters (*Myrmecophaga tridactyla*). Journal of Zoo and Wildlife Medicine 37: 427–429.

Naples, V. L. 1999. Morphology, evolution and function of feeding in the giant anteater, *Myrmecophaga tridactyla*. Journal of Zoology 249: 19–41.

Nishihara H., S. Kuno, M. Nikaido & N. Okada. 2007. MyrSINEs: a novel SINE family in the anteater genomes. Gene 400: 98–103.

Nofs, S., M. Abd-Eldaim, K. V. Thomas , D. Toplon , D. Rouse & M. Kennedy. 2009. Influenza virus A (H1N1) in giant anteaters (*Myrmecophaga tridactyla*). Emerging Infectious Diseases 15: 1081–1083.

Oliveira, L. C., S. M. Mendel, D. Loretto, J. S. Silva Júnior & G. W. Fernandes. 2006. Edentates of the Saracá-Taquera National Forest, Pará, Brazil. Edentata 7: 3-7.

Olmos, F. 1995. Edentates in the Caatinga of Serra da Capivara National Park. Edentata 2: 16–17.

Orr, C. M. 2005. Knuckle-walking anteater: a convergence test of adaptation for purported knuckle-walking features of African Hominidae. American Journal of Physical Anthropology 128: 639–658.

Patzl, M., F. Schwarzenberger, C. Osmann, E. Bamberg & W. Bartmann. 1998. Monitoring ovarian cycle and pregnancy in the giant anteater (*Myrmecophaga tridactyla*) by faecal progestagen and oestrogen analysis. Animal Reproduction Science 53: 209–219.

Pereira, H. R. J., W. Jorge & M. E. L. T. da Costa. 2004. Chromosome study of anteaters (Myrmecophagideae, Xenarthra) – a preliminary report. Genetics and Molecular Biology 27: 391–394.

Pérez-Jimeno, G. & L. Llarín Amaya. 2009. Contribución al conocimiento de la distribución del oso hormiguero gigante (*Myrmecophaga tridactyla*) en Argentina. Edentata 8–10: 8–12.

Portillo, H. O., W. A. Matamoros & S. L. Glowinski. 2010. Distribution and conservation status of the giant anteater (*Myrmecophaga tridactyla*) in Honduras. Southwestern Naturalist 55: 118–120.

Prada, M. & J. Marinho-Filho. 2004. Effects of fire on the abundance of Xenarthrans in Mato Grosso, Brazil. Austral Ecology 29: 568–573.

Redford, K. H. 1985. Feeding and food preference in captive and wild giant anteaters (*Myrmecophaga tridactyla*). Journal of Zoology 205: 559–572.

Redford, K. H. 1994. The edentates of the Cerrado. Edentata 1: 4–10.

Reece, V. & J. Jordan. 1977. Femoral head ostectomy in a giant anteater, *Myrmecophaga tridactyla*. The Journal of Zoo Animal Medicine 8: 24–27.

Rocha, F. L. & G. Mourão. 2006. An agonistic encounter between two giant anteaters (*Myrmecophaga tridactyla*). Edentata 7: 50–51.

Rodrigues, F. H. G., G. H. B. de Miranda, Í. M. Medri, F. V. dos Santos, G. Mourão, A. Hass, P. S. T. Amaral & F. L. Rocha. 2003. Fitting radio transmitters to giant anteaters (*Myrmecophaga tridactyla*). Edentata 5: 37–40.

Romero, J. A. A., P. C. C. Martínez, S. A. O. Holguín & R. M. Pacheco. 2010. Notas sobre el comportamiento de cortejo y apareamiento de *Myrmecophaga tridactyla* bajo condiciones *Ex Situ*. Edentata 11: 34–43.

Sanderson J. & L. Silveira. 2003. Observations of Xenarthra in the Brazilian Cerrado and Guyana. Edentata 5: 41–44.

Shaw, J. H., J. Machado-Neto & T. S. Carter. 1987. Behavior of free-living giant anteaters (*Myrmecophaga tridactyla*). Biotropica 19: 255–259.

Shaw, C. A. & H. G. McDonald. 1987. First record of giant anteater (Xenarthra, Myrmecophagidae) in North America. Science 236: 186–188.

Sherwood, C. C., C. D. Stimpson, C. Butti, C. J. Bonar, A. L. Newton, J. M. Allman & P. R. Hoff. 2009. Neocortical neuron types in Xenarthra and Afrotheria: Implications for brain evolution in mammals. Brain Structure and Function 213: 301–328.

Silveira, L., F. H. G. Rodrigues & A. T. Jácomo. 1999. Impact of wildfires on the megafauna of Emas National Park, central Brazil. Oryx 33: 108–114.

Souza, W. M., M. A. Miglino, I. G. Arantes & A. A. Nascimento.1991. Topography of the blood vessels in the hilum of the kidney of *Myrmecophaga tridactyla*. Anatomischer Anzeiger 173: 1–7.

Souza, A. L. R. de, L. C. Rezende, A. R. Mortoza & J. R. Ferreira. 2010. Modelo de suprimento sanguíneo do intestino grosso do tamanduá bandeira (*Myrmecophaga tridactyla*). Ciências Rurais 40: 541–547.

Steinmetz, H. W., M. Clauss, K. Feige, T. Thio, E. Isenbügel & J. M. Hatt. 2007. Recurrent tongue tip constriction in a captive giant anteater (*Myrmecophaga tridactyla*). Journal of Zoo and Wildlife Medicine 38: 146–149.

Superina, M. & J. M. Aguiar. 2006. A reference list of common names for the Edentates. Edentata 7: 33–44.

Timm, R. M., D. Lieberman, M. Lieberman & D. McClearn. 2009. Mammals of Cabo Blanco: History, diversity, and conservation after 45 years of regrowth of a Costa Rican dry forest. Forest Ecology and Management 258: 997–1013.

Urashima, T., M. Komoda, S. Asakuma, Y. Uemura, K. Fukuda, T. Saito & O. T. Oftedal. 2008. Structural determination of the oligosaccharides in the milk of a giant anteater (*Myrmecophaga tridactyla*). Animal Science Journal 79: 699–709.

Vaz, S. M. 2003. Lista de localidades de captura de xenartros sob ameaça de extinção no Brasil. Edentata 5: 4–5.

Vynne, C., J. L. Keim, R. B. Machado, J. Marinho-Filho, L. Silveira, M. J. Groom & S. K. Wasser. 2011. Resource selection and its implications for wide-ranging mammals of the Brazilian Cerrado. PLoS One 6(12): e28939.

Vynne C., R. B. Machado, J. Marinho-Filho & S. K. Wasser. 2009. Scat-detection dogs seek out new locations of *Priodontes maximus* and *Myrmecophaga tridactyla* in Central Brazil. Edentata 8–10: 13–14.

Vynne, C., J. R. Skalsk, R. B. Machado, M. J. Groom, A. T. Jacomo, J. Marinho-Filho, M. B. Ramos Neto, C. Pomilla, L. Silveira, H. Smith & S. K. Wasser. 2011. Effectiveness of scat-detection dogs in determining species presence in a tropical savanna landscape. Conservation Biology 25: 154–162.

Washington, D. C., S. Morford & M. A. Meyers. 2003. Giant anteater (*Myrmecophaga tridactyla*) health care survey. Edentata 5: 5–20.