

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

Authors: Diniz, Milena F., and Brito, Daniel

Source: Edentata, 13(1) : 76-83

Published By: IUCN/SSC Anteater, Sloth and Armadillo Specialist Group

URL: <https://doi.org/10.5537/020.013.0108>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

SHORT COMMUNICATION

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

MILENA F. DINIZ^{A,1} AND DANIEL BRITO^A

^AUniversidade Federal de Goiás, Instituto de Ciências Biológicas, Departamento de Ecologia, Laboratório de Ecologia Aplicada e Conservação. Goiás, Goiânia 74001-970, Caixa Postal 131, Brazil. Email: midiniz3@hotmail.com (MFD); brito.dan@gmail.com (DB).

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 (<[76](http://portal.</p></div><div data-bbox=)

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.

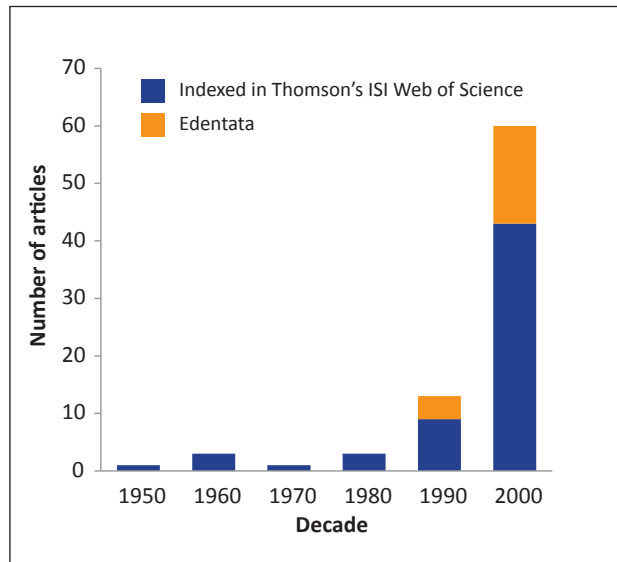


FIGURE 1. Total number of articles on giant anteater (*Myrmecophaga tridactyla*) biology published in journals indexed in Thomson's ISI Web of Science (<<http://portal.isiknowledge.com>>) and in Edentata per decade.

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**).

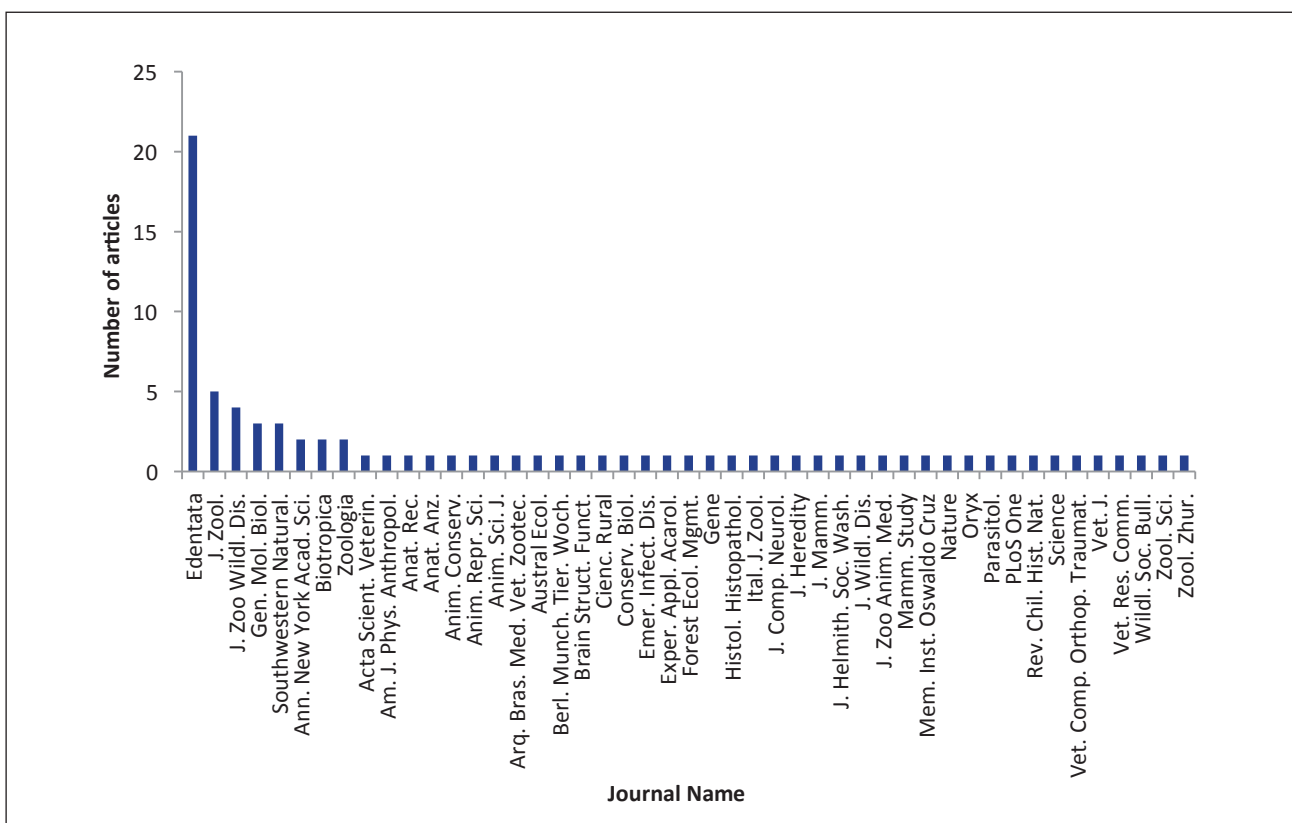


FIGURE 2. Number of journals indexed in Thomson's ISI Web of Science plus Edentata that have published articles on giant anteater (*Myrmecophaga tridactyla*) biology.

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.

<i>In situ</i> 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 <i>et al.</i> (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 <i>et al.</i> (1999)
	Not informed	Bechara <i>et al.</i> (2002)
	18°19'S; 52°45'W	Sanderson & Silveira (2003)
	Not informed	Lima <i>et al.</i> (2004)
	18°18'S; 52°54'W	Garcia <i>et al.</i> (2005)
	18°15'S; 52°53'W	Collevatti <i>et al.</i> (2007)
Not informed	Vynne <i>et al.</i> (2009)	
Roraima, Brazil	02°49'N; 60°39'W	Kreutz <i>et al.</i> (2009)
Rio das Mortes Xavante Reserve, Brazil	Not informed	Leeuwenberg (1987)
	Not informed	Prada & Marinho-Filho (2004)
Bragança, Brazil	Not informed	Barros <i>et al.</i> (2003)
Brasília National Park, Brazil	15°35'S; 48°05'W	Lacerda <i>et al.</i> (2009)
Serra da Canastra National Park, Brazil	20°20'S; 46°38'W	Shaw <i>et al.</i> (1987)
Jaguariaíva, Brazil	24°15'S; 49°42'W	Braga <i>et al.</i> (2010)
Noël Kempff Mercado National Park, Bolivia	14°33'S; 60°55'W	Emmons <i>et al.</i> (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	<i>a</i>	Portillo <i>et al.</i> (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.

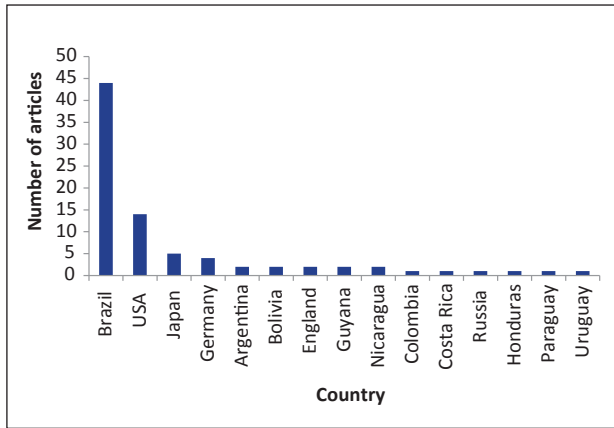


FIGURE 3. Countries where research on giant anteater (*Myrmecophaga tridactyla*) biology was conducted.

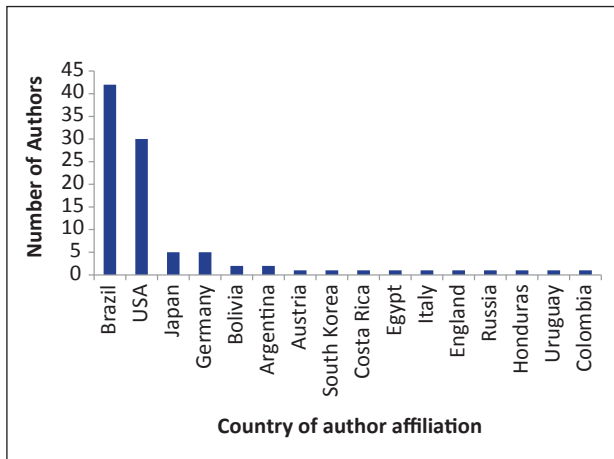


FIGURE 4. Number of authors working on giant anteater (*Myrmecophaga tridactyla*) biology per country of affiliation.

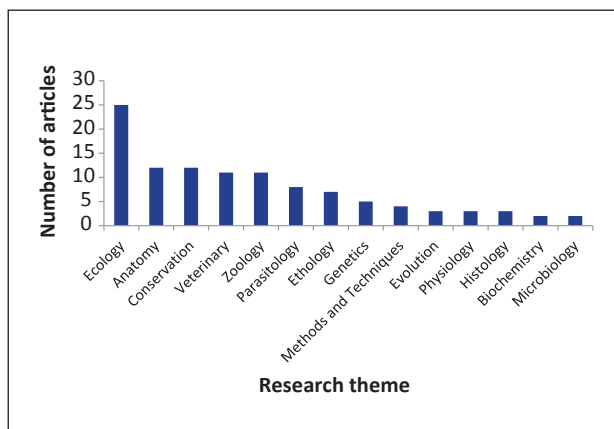


FIGURE 5. Number of articles on giant anteater (*Myrmecophaga tridactyla*) biology per research theme.

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 a famous John Doe of wildlife conservation.

ACKNOWLEDGEMENTS

We would like to thank two anonymous reviewers and Mariella Superina who provided valuable comments and suggestions in the manuscript. Milena F. Diniz thanks CNPq for a PIBIC scholarship. Daniel Brito's research is supported by the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) (project #305631/2009-8).

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.

Received: 31 August 2012; Accepted 20 October 2012

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 lumbar 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, *Deraiphoronema 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 tridactyla* 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. Osmani, E. Bamberg & W. Bartmann. 1998. Monitoring ovarian cycle and pregnancy in the giant anteater (*Myrmecophaga tridactyla*) by faecal progesterone 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 (Myrmecophagidae, 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 *Prionomys 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.