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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.

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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.

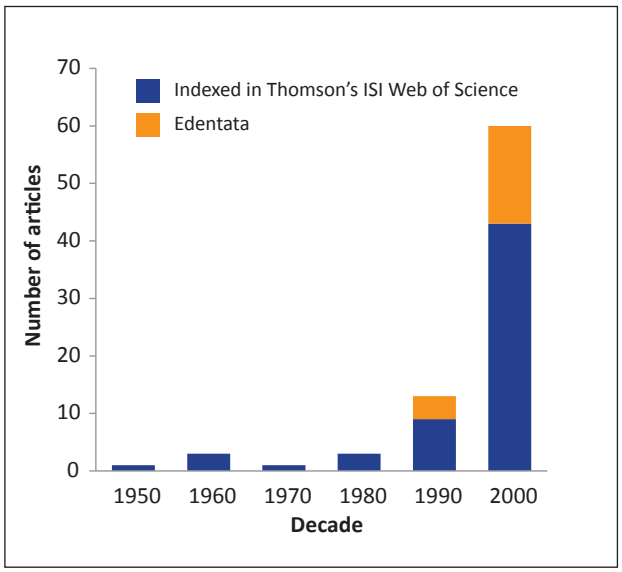


FIGURE 1. Total number of articles on giant anteater (*Myrmecophaga tridactyla*) biology published in journals indexed in Thomson's ISI Web of Science (<http://portal.isiknowledge.com>) and in Edentata per decade.

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**).

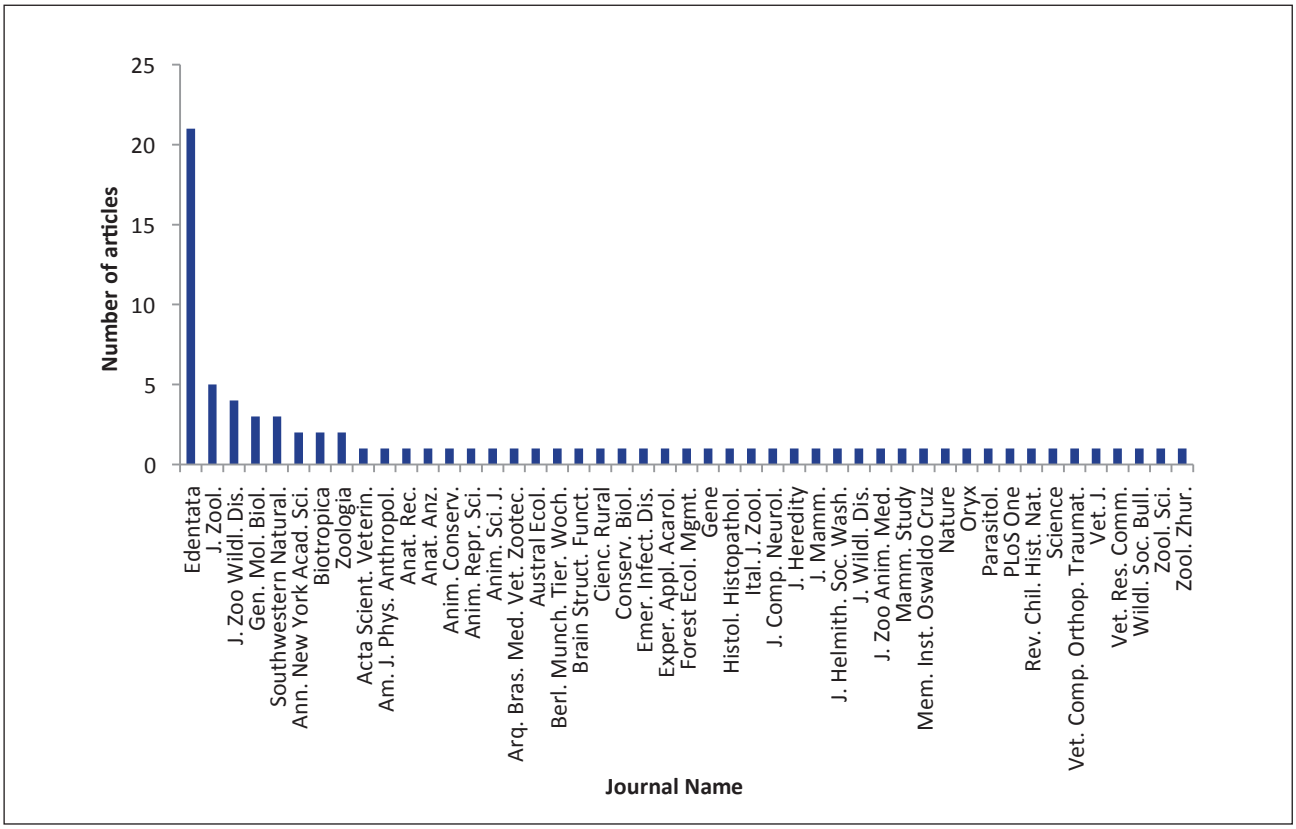


FIGURE 2. Number of journals indexed in Thomson's ISI Web of Science plus Edentata that have published articles on giant anteater (*Myrmecophaga tridactyla*) biology.

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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.

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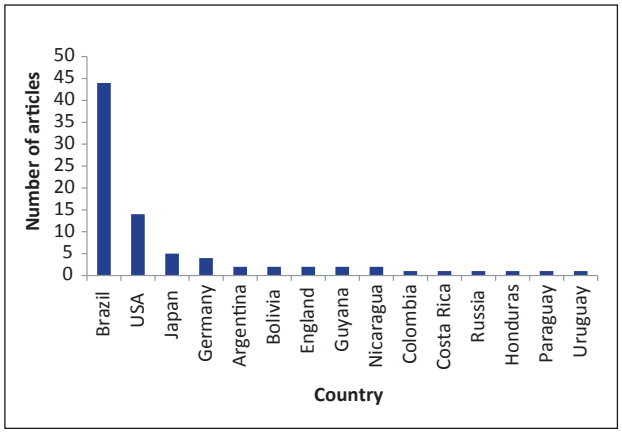


FIGURE 3. Countries where research on giant anteater (*Myrmecophaga tridactyla*) biology was conducted.

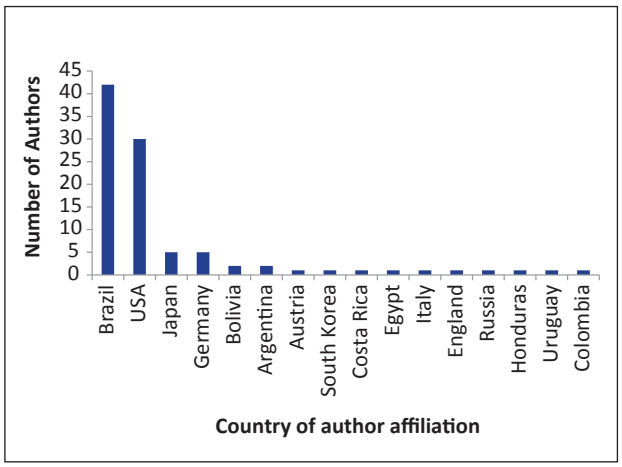


FIGURE 4. Number of authors working on giant anteater (*Myrmecophaga tridactyla*) biology per country of affiliation.

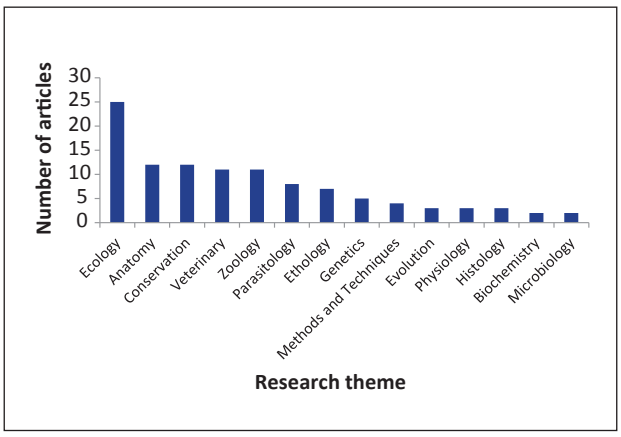


FIGURE 5. Number of articles on giant anteater (*Myrmecophaga tridactyla*) biology per research theme.

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

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