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**New records of the southern naked-tailed armadillo
Cabassous unicinctus unicinctus Linnaeus, 1758 (Cingulata: Dasypodidae) in Brazil**

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ANACLETO, T.C.S., GODOY, L.P. & TUBELIS, D.P. **New records of the southern naked-tailed armadillo *Cabassous unicinctus unicinctus* Linnaeus, 1758 (Cingulata: Dasypodidae) in Brazil.** *Biota Neotrop.* 13(2): <http://www.biotaneotropica.org.br/v13n2/en/abstract?short-communication+bn00213022013>

Abstract: The geographic distribution of *Cabassous unicinctus* is poorly known due to the low number of available records. Two subspecies with distributions limited by the Amazonas River were recognized in 1980. *Cabassous u. unicinctus* has been found north of this river, while *C. u. squamicaudis* occurs in areas south of the river. This study aimed to update the distribution records of *C. u. unicinctus* in Brazil. We compiled records from literature, museum collections and field studies. New records of this subspecies were obtained from the Brazilian states of Acre, Pará, Rondônia and Mato Grosso. These records enlarge a geographic distribution of *C. u. unicinctus* to Amazonian and Cerrado biomes, regions located south of the Amazon River.

Keywords: *Xenarthra*, geographic distribution, armadillo, Amazonas, Cerrado, Mato Grosso.

ANACLETO, T.C.S., GODOY, L.P. & TUBELIS, D.P. **Novos registros do tatu-de-rabo-mole *Cabassous unicinctus unicinctus* Linnaeus, 1758 (Cingulata: Dasypodidae) no Brasil.** *Biota Neotrop.* 13(2): <http://www.biotaneotropica.org.br/v13n2/pt/abstract?short-communication+bn00213022013>

Resumo: A distribuição geográfica de *Cabassous unicinctus* é pouco conhecida devido ao baixo número de registros disponíveis. Foram reconhecidas na década de 1980 duas subespécies, sendo as distribuições limitadas pelo Rio Amazonas. *Cabassous u. unicinctus* tinha sido encontrado ao norte do rio, enquanto *C. u. squamicaudis* foi encontrado em áreas ao sul deste rio. Este estudo visa atualizar os registros de distribuição de *C. u. unicinctus* no Brasil. Nós compilamos registros de literatura, coleções de museus e estudos de campo. Novos registros dessa subespécie foram obtidos nos seguintes estados brasileiros: Acre, Pará, Rondônia e Mato Grosso. Esses registros ampliam a distribuição geográfica de *C. u. unicinctus* nos biomas Amazônia e Cerrado, em regiões localizadas ao sul do Rio Amazonas.

Palavras-chave: *Xenarthra*, distribuição geográfica, tatu, Amazonas, Cerrado, Mato Grosso.

Introduction

Armadillos of the genus *Cabassous* Mc Murtrie, 1831 are widely distributed, occurring from southern Mexico to Argentina (Wetzel et al. 2007, CONABIO). Four species are currently recognized: *C. centralis* (Miller, 1899), *C. chacoensis* Wetzel, 1980, *C. unicinctus* (Linnaeus, 1758) and *C. tatouay* (Desmarest, 1804). This genus is the second largest in number the species, surpassed by the *Dasyurus* genus. Members of this genus have carapace very flexible with a variable number of movable bands (usually eleven), and a rounded tail that may be unarmored or partially armored with scattered, small scutes and scales (Wetzel 1980, 1985). The naked tail distinguishes this genus from all other armadillos (Eisenberg & Redford 1999).

All four species of *Cabassous* are threatened by illegal hunting and the permanent issue of habitat degradation in countries such as Brazil (Aguar & Fonseca 2008). In addition to these negative factors, there are problems related to mis-identifications of holotypes and the provenance of some *Cabassous* specimens deposited in museum collections. The specimen from British Museum - Natural History BMNH 55.8.28.7 is syntype, not holotype and "St. Catherine's" may be French Guiana (Sainte Catherine) or Brazil (Santa Catarina), see more problems in Cabrera (1958), Wetzel (1980) and Wetzel et al. (2007).

The only taxonomic review of this genus was done by Wetzel (1980). Using qualitative comparisons and statistical analyses, this author reorganized the confusing taxonomy and grouped the numerous synonyms into four species, distinguished two subspecies within *C. unicinctus* and provided a map detailing their distribution, including point localities for *C. u. unicinctus* (Linnaeus, 1758) and *C. u. squamicaudis* (Lund, 1845). The two subspecies were separated by these characters: *C. u. unicinctus* has a larger body and cranium, fewer scutes on the cephalic shield, cheek below eye without scales or with few scales, naked posterior face of pinna and fewer scales on the tail. Otherwise, *C. u. squamicaudis* has a small body and cranium, more scutes on the cephalic shield, more scales on cheek, posterior side of pinna and on the tail. However, Wetzel (1980) did not examine any *C. u. unicinctus* from Brazil.

Few studies have plotted the distribution records of these two subspecies on maps (Wetzel 1980, 1982, 1985). According to the information published nearly thirty years ago, *Cabassous u. unicinctus* appears to be restricted to northern South America, encompasses the east of the Andes, including the Guyanas, Venezuela, Colombia, Ecuador and Peru, with its southernmost occurrence limited by the Amazonas River, north of the Brazil. Wetzel (1980, 1982) described this river as a zone of integration of this subspecies with *C. u. squamicaudis*, which occurs south of the Amazonas River.

This paper provide records of *C. u. unicinctus* in north of Brazil (Acre, Pará and Rondônia states) and the firsts records in central Brazil (Mato Grosso state). These records extend the known range of the species approximately 1,000 km away from the previously known geographic distribution, including Cerrado biome.

Material and Methods

We compiled data points from live animals captured by field researchers between 2006 and 2011 and from animals housed in the following collections: National Institute of Amazonian Research (Instituto Nacional de Pesquisa Amazônica – INPA), Museum of Zoology of the University of São Paulo (MZUSP), National Museum of Natural History (NMNH) and American Museum of Natural History (AMNH). As recognition of data points of animals found in the AMNH and NMNH collections were based on citations of localities on specimen labels, the geographical coordinates of these points were obtained from the gazetteer produced by Gardner (2007). Coordinates of other data points were indicated by the collectors or obtained by investigators during more recent field work. All data points were imported into a GIS platform (Arc View) to generate a distribution map of *C. u. unicinctus*.

The identification of the specimens was based on external diagnostic traits of the species cited by Wetzel (1980), including: scutes of the cephalic shield (37 ± 4.1 n=8), cheek below eye without scales or with few scales, naked posterior face of pinna and fewer scales on the tail. Some external measurements were taken from specimen labels of five armadillos (Table 1). Another distinctive characteristics used in this study is the carapace sharply marked laterally by a buffy border, as well as a rosaceous snout and abdomen; these body regions are darker in *C. u. squamicaudis*. Only two other armadillo species have a carapace with a buffy border: the northern naked-armadillo (*C. centralis* Miller, 1899) and the giant armadillo (*Prionomys maximus* Kerr, 1792).

Results and Discussion

We compiled 16 records of *C. u. unicinctus* in the Neotropical region (Table 2). The specimens found in the collections of AMNH (n=4) and NMNH (n=2) are the same as those analyzed by Wetzel (1980) in his revision of the genus *Cabassous* (Figure 1). These records were limited to the northern region of South America (Venezuela, Guyana and Peru). Other specimens found in museums were collected in the Brazilian states of Acre (n=1, INPA) and Pará (n=1, MZUSP).

Eight other records involve photos of animals found in the states of Pará, Mato Grosso and Rondônia: 1) two road-killed armadillos from the states of Rondônia (Cacoal) and Pará (Santarém); 2) one individual hunted by sustainable indigenous people in the Tapirapé Indigenous Land, in Confresa, Mato Grosso; 3) five armadillos that were captured and released in Pará (Pauzebas), Rondônia (Porto Velho and Chupinguáia) and Mato Grosso (Paranaíta and Lucas do Rio Verde) (Table 2).

Cabassous armadillos are poorly represented in collections. To review the genus, Wetzel (1980) analyzed 176 specimens housed in the major collections of the world. He visited 34 institutions in 14 countries. His work involved the examination of 37 specimens of *C. u. squamicaudis*, of which only two animals were not from Brazil. Furthermore, all 41 analyzed specimens of *C. u. unicinctus* were from

Table 1. External measurements (in mm) of *Cabassous u. unicinctus*. American Museum of Natural History – AMNH, National Museum of Natural History – NMNH, Instituto de Pesquisas da Amazônia – INPA and Museum of Zoology - University of São Paulo – MZUSP.

Identification	Head + body	Ear	Tail	Foot	Sex	Weight, kg
NMNH 253986	498	-	192	73	M	-
NMNH 296613	400	-	173	79	M	-
AMNH 98459	285	30	165	90	M	-
INPA 2861	355	36	172	76	F	2.00
MZUSP MB5	380	39	165	74	M	3.60

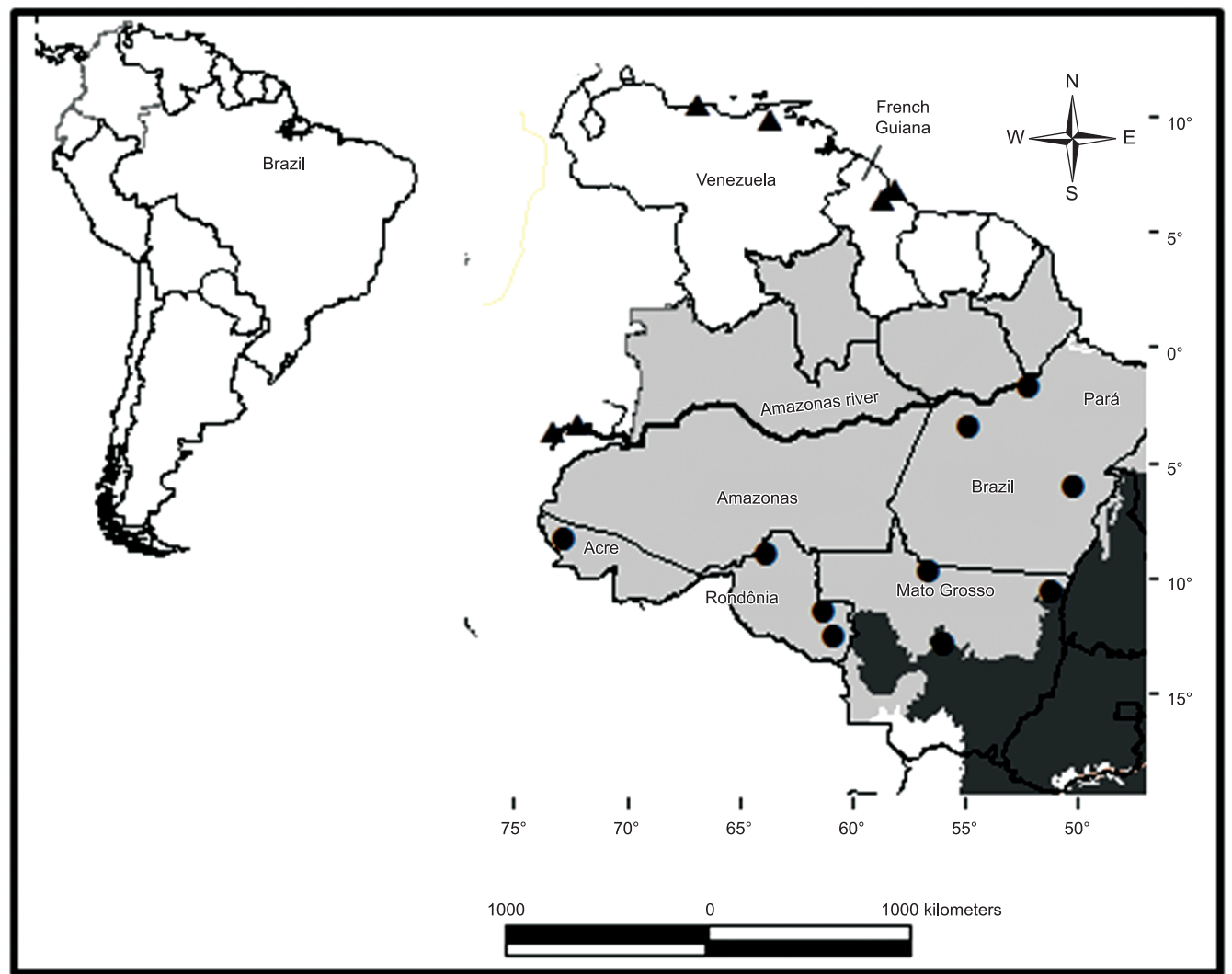


Figure 1. Distribution of *Cabassou u. unicinctus* with 6 records examined for Wetzel (1980), from American Museum of Natural History and National Museum of Natural History (▲), and new records compiled by this study (●). Biomes Amazon (■) and Cerrado (■).

Table 2. Records of *Cabassou u. unicinctus*, with information on the location, geographic coordinates, type of records and identification of collection material and contributors of unpublished data. American Museum of Natural History – AMNH, National Museum of Natural History – NMNH, Instituto de Pesquisas da Amazônia – INPA and Museum of Zoology - University of São Paulo – MZUSP.

Country / Locality	Geographic coordinates	Type of records / identification
Venezuela / San Julian	10°28' S 66°52' W	NMNH 253986
Venezuela / Monagas, Caiçara	09°49' N 63°36' W	NMNH 296613
British Guyana / Georgetown	06°48' N 58°10' W	AMNH 207370
British Guyana / Kartabo	06°23' N 58°41' W	AMNH 142994
Peru / Loreto, Iquitos	03°46' S 73°15' W	AMNH 98459
Peru / Loreto, Orosa	03°26' S 72°08' W	AMNH 74113
Brazil / Acre, Cruzeiro do Sul (Juruá River)	08°22' S 72°49' W	INPA 2861
Brazil / Pará, Parauapebas	06°03' S 50°10' W	Photo/ Karla Leal
Brazil / Pará, Santarém (Br 163)	03°34' S 54°52' W	Photo/ Herbert S. Soares
Brazil / Pará, Porto de Moz (Xingu River)	01°44' S 52°14' W	MZUSP- MB5
Brazil / Rondônia, Cacoal (Br 364)	11°32' S 61°18' W	Photo/ Sérgio G. Silva
Brazil / Rondônia, Porto Velho	08°45' S 63°54' W	Photo/ Leandro P. Godoy
Brazil / Rondônia, Chupinguáia	12°32' S 60°54' W	Photo/ Leandro P. Godoy
Brazil / Mato Grosso, Confresa	10°39' S 51°17' W	Photo/ Herbert S. Soares
Brazil / Mato Grosso, Paranaíta	9°40' S 56°28' W	Photo/ Leandro P. Godoy
Brazil / Mato Grosso, Lucas do Rio Verde	13°03' S 55°55' W	Photo/ Leandro P. Godoy

regions outside of Brazil and the specimen AMNH 95298, from Pará state, was considered as *C. u. squamicaudis*, although the external characters are the *C. u. unicinctus*.

The distribution of *C. u. unicinctus* proposed by Wetzel (1980, 1982) encompasses an area east of the Andes and north of the Amazon, including the Guyanas and parts of Brazil, Venezuela, Colombia, Ecuador and Peru. In Brazil, its distribution is restricted to regions located north of the Amazonas River. This river is described as a zone of integration of this subspecies with *C. u. squamicaudis*, which occurs south of the Amazonas River (Wetzel 1980, 1982). However, there is no explanation of how this zone of integration was established.

With the exception of Wetzel's investigations (1980, 1982, 1985), no studies provided morphological characteristics or maps that show the geographic distribution of *C. u. unicinctus* and *C. u. squamicaudis*. Recently, Smith et al (2011) documented the first specimens of *Cabassous u. squamicaudis* from Paraguay. The available information most often refers to *C. unicinctus* with a morphological description of one of the two subspecies, with maps that show the wide distribution of *C. unicinctus* (Emmons & Feer 1990, Eisenberg & Redford 1999, Gardner 2007, Aguiar & Fonseca 2008).

The information compiled in our study indicates that the range of *C. u. unicinctus* goes beyond the Amazon River, reaching the states of Mato Grosso, Pará and Rondônia. Most of our records (n=8) that were found south of this river occurred in the Amazonian region. On the other hand, we obtained a record in Confresa (Mato Grosso), which lies in a transition area between the Amazon and Cerrado biomes. Another record outside the Amazon region occurred at Lucas do Rio Verde, a Cerrado locality in Mato Grosso, and involved an armadillo using forested areas along the margins of the Verde River. This record expands the known range of occurrence of *C. u. unicinctus* to a biome other than the Amazon, in an area located about 1,000 km away from the previously known geographic distribution. Probably this species was always there and never had been recorded.

The potential distribution of *C. unicinctus* predicted a wide range in Brazil, including the Amazon and the Cerrado (Anacleto et al. 2006). Our study confirms the real occurrence of *C. u. unicinctus* in these two biomes. Investigations that evaluated resources required by *C. unicinctus* argued that there is a restriction in the use of these habitats, and pointed out that the species is rare in forests (Encarnação 1986, Emmons & Feer 1990). More recent studies suggest that *C. unicinctus* occurs in complex vegetation structures, such as forests (Bonato et al. 2008, Abba & Superina 2010). Despite this knowledge about the species, no studies provided information on habitat preferences by the subspecies *C. u. unicinctus*. Our records in the Amazon and in forested areas in the Cerrado and ecotonal zones between these two biomes suggest that the subspecies *C. u. unicinctus* is restricted to forest habitats.

The compilation of records in our study shows that the knowledge on the geographic distribution of *Cabassous* taxa is quite little, and can change substantially with a few additional records. Further investigations are needed on the entire genus and to assess whether the two subspecies are actually to separate species.

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