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## RANGE EXTENSION AND FIRST RECORD OF *Cryptonanus chacoensis* (MAMMALIA, DIDELPHIMORPHIA, DIDELPHIDAE) IN WEST MINAS GERAIS STATE, BRAZIL

*Extensión del rango distribucional y primer registro de Cryptonanus chacoensis (Mammalia, Didelphimorphia, Didelphidae) en el Oeste del Estado de Minas Gerais, Brasil*

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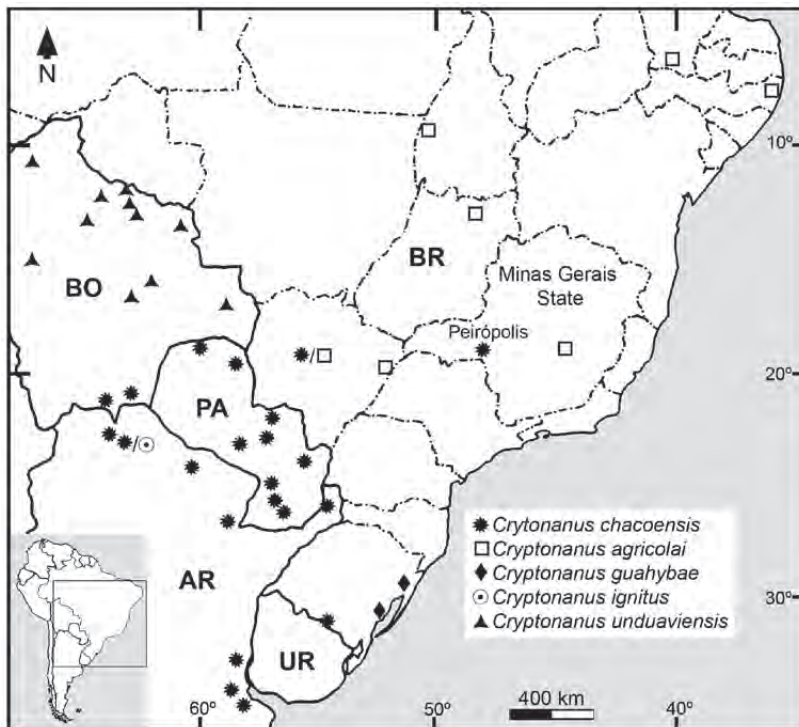
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## INTRODUCTION

The genus *Crytonanus* Voss, Lunde, and Jansa 2005 was recently erected to include five small didelphid marsupials: *C. agricolai* (Moojen, 1943), *C. chacoensis* (Tate, 1931), *C. guahybae* (Tate, 1931), *C. ignitus* (Díaz, Flores, and Barquez, 2002), and *C. unduaviensis* (Tate, 1931), previously included within the genus *Gracilinanus* Gardner and Creighton 1989 (Voss *et al.*, 2005). Among them, *C. agricolai*, *C. guahybae*, and *C. chacoensis* occur in Brazil. *C. agricolai* was reported in the Caatinga and the Cerrado biomes from Ceará, Goiás, and north of Minas Gerais states (Voss *et al.*, 2005) (Figure

1). Additional references cited *C. agricolai* in faunal lists of the Tocantins (Bezerra *et al.*, 2009) and Mato Grosso do Sul (Cáceres *et al.*, 2008a, b, 2010) states. Moreover, Souza *et al.* (2010) reported one specimen of *Crytonanus*, tentatively assigned to *C. agricolai*, in the Atlantic Forest, east of the Pernambuco State. With regard to *C. guahybae*, it was exclusively recognized for the Atlantic Forest biome from the Rio Grande do Sul State (Voss *et al.*, 2005) (Figure 1). Although *C. chacoensis* was not cited for Brazil by Voss *et al.* (2005), subsequent faunal lists reported this species in the Mato Grosso do Sul State (*e.g.*, Rossi *et al.*, 2006, Cáceres *et al.*, 2008a). Besides, Gardner (2007, based on



**Figure 1** - Map showing the distribution of *Crytonanus* species and the town of Peirópolis with the new record of *C. chacoensis*. Locations points are based on Voss *et al.* (2005), Gardner (2007), Cáceres *et al.* (2008a, b, 2010), Bezerra *et al.* (2009), and Souza *et al.* (2010). Records of *Crytonamus* sp. from numerous localities from Uruguay (D'Elia and Martínez 2006) were omitted in the map. Abbreviations: AR, Argentina; BO, Bolivia; BR, Brazil; PA, Paraguay; UR, Uruguay.

González *et al.*, 1999) mentioned the presence of *C. chacoensis* in the Rio Grande do Sul State, close to the frontier with Uruguay (Figure 1). This latter record was considered as *Cryptonanus* sp. by D'Elía and Martínez (2006), which also cited *C. sp.* for the Mato Grosso do Sul, close to the frontier with Bolivia. As was stated by Cáceres *et al.* (2008a), the analyses on the taxonomy of *Cryptonanus* species by Voss *et al.* (2005) did not include a considerable number of Brazilian specimens; consequently, detailed studies focused on the assignments and taxonomic component of this genus are pending in Brazil.

New marsupial remains collected from naturally disaggregated Barn Owl, Strigiformes, Tytonidae, *Tyto alba* (Scopoli, 1769) pellets, indicate the presence of *Cryptonanus chacoensis* in the west of the Minas Gerais State (Brazil). This finding extends the geographical range of the species about 930 km northeast of Paraguay or about 800 km east from the putative record from Mato Grosso do Sul State, and represents the first record in the Cerrado of Minas Gerais State (Figure 1). The pellet material was collected in 2010 from an abandoned old house (19°44'33" S, 47°44'32" W; 850 m AMSL), in the rural town of Peirópolis, about 20 km west from the Uberaba city. The locality is included within the Cerrado (Savanna) biome and is characterized by a seasonal and tropical climate with dry winters and wet summers (Oliveira and Marquis, 2002). The study area is strongly modified by agricultural activities with small remnants of native vegetation which include open grasslands and dense arboreal woodlands. In addition to *C. chacoensis*, the other hitherto small-sized marsupial recognized from the pellets is *Gracilinanus agilis* (Burmeister, 1854), coinciding with the known range distribution for this spe-

cies (*e.g.*, Gardner, 2007; Geise and Astúa, 2009).

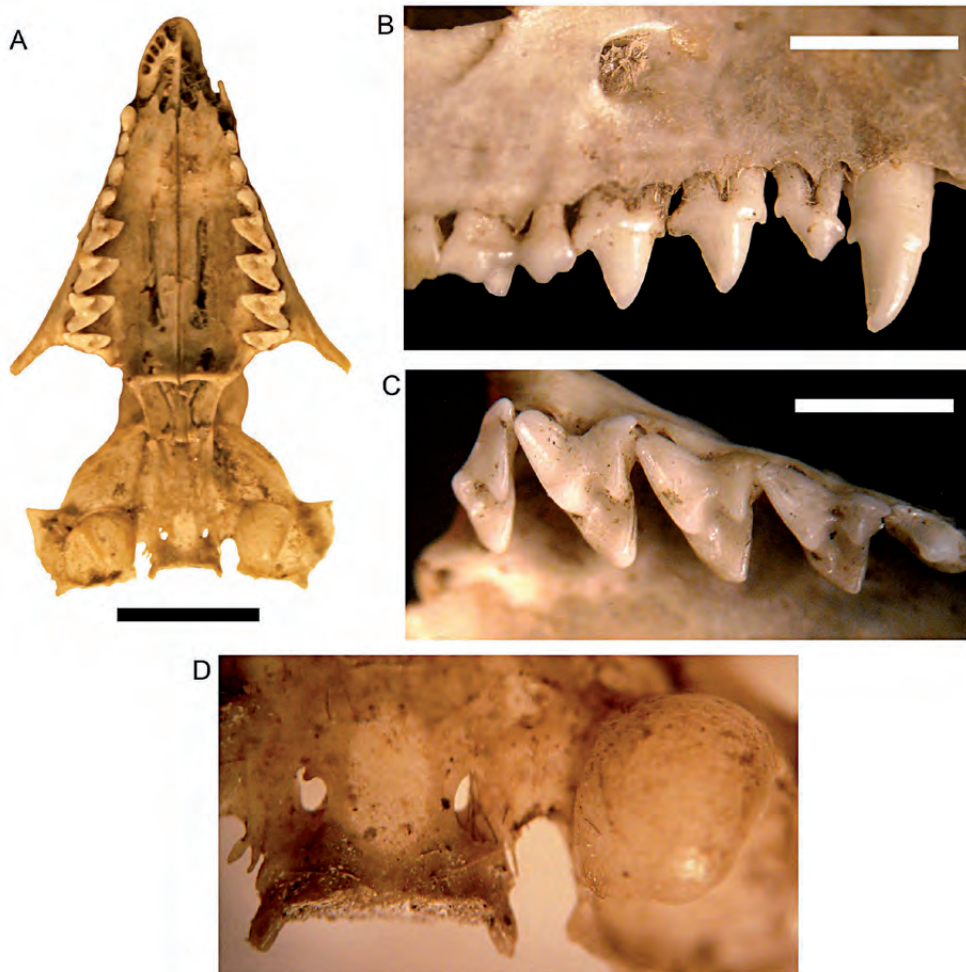
The *C. chacoensis* specimens reported here are housed at the Complexo Cultural e Científico Peirópolis (CCCP/UFTM), Uberaba (MG), under the name CPP-Eg: Centro de Pesquisas Paleontológicas Llewellyn Ivor Price, Coleção Egagrópilas. Voss and Jansa (2003) is followed for osteological terminology; C, P, M refer to canine, premolar, and molar with super- or subscript indicating upper and lower positions, respectively. The material was compared with specimens of small Didelphinae deposited in the collection of the Department of Mastozoology of the MACN (Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina) and with bibliographical sources.

## RESULTS AND DISCUSSIONS

With the exception of a fairly complete skull (CPP-Eg-001) with associated dentary and complete dentition (Figure 2), the remaining specimens consist of isolated upper and lower jaws. The genus *Cryptonanus* was recognized on the basis of the following association of characters: 1) maxillopalatine fenestrae large; 2) maxillary fenestrae absent (differing from *Gracilinanus* and *Thylamys* species in which maxillary fenestrae are present; Voss *et al.*, 2005; Carmignotto and Monfort, 2006); 3) posterolateral palatal foramina not extending lingual to M<sup>4</sup> protocone; 4) absence of a secondary foramen ovale (differing from most *Gracilinanus* and *Monodelphis* species, among other small sized didelphids in which the secondary foramen ovale is present; Voss and Jansa, 2003); 5) C<sup>1</sup> with one or two small accessory cusps (differing from some *Thylamys* species and most specimens of *Gracilinanus* which

have  $C^1$  without accessory cusps; Voss *et al.*, 2005); 6)  $P^2$  distinctly shorter than  $P^3$  (being  $P^2$  sub-equal to  $P^3$  in *Gracilinanus* or taller than  $P^3$  in *Chacodelphis*; Voss *et al.*, 2004; Teta and Pardiñas, 2007); 7) incomplete anterior cingulum on  $M^3$ ; and 8) procumbent  $C_1$ , with small posterior accessory cusp (Voss *et al.*, 2005).

The additional fragmentary remains (CPP-Eg-002-012) were included in this genus due to the presence of features 1, 2, 5, and 6. Based on the absence of an incomplete anterior cingulum on  $M^3$  (differing from other *Cryptonanus* species) and size (based on upper molar length measurements; Voss *et al.*, 2005), the new material



**Figure 2** - Partial skull of *Cryptonanus chacoensis* (CPP-Eg-001) from Peirópolis, Uberaba, Minas Gerais State, Brazil. A, ventral view of the skull; B, detail of the right C and  $P^1$ - $M^1$  in labial view; C, detail of the right  $P^3$ - $M^4$  in ventral view; D, detail of the left secondary foramen ovale region in posteroventral view. Scale bar equals 5 mm in A and 2 mm in B-C.

is assigned to *Cryptonanus chacoensis*. The specimen figured has all teeth erupted being considered an adult specimen (Class G4 *sensu* Nievelt and Smith, 2005). In other smaller specimens (i.e., M<sup>4</sup> not totally erupted) the condition of an incomplete cingulum on M3 is also observed. At present, the differences between *C. chacoensis* and *C. agricolai* with *C. guahybae* are based on external morphology features and in the fact that the latter species is geographically restricted to the Atlantic Forest of Rio Grande do Sul State (Voss *et al.*, 2005), reasons to be aware at the moment of classifying species based only upon isolated osteological remains. In addition, the material reported here differs from *C. unduaviensis* in having a smaller molar row length (<5.4 mm; Voss *et al.*, 2005). *C. chacoensis* and *C. ignitus* weakly differentiate from each other, being the coloration pelage a putative feature to distinguish both species (Voss *et al.*, 2005). At present, the latter species is listed as extinct in the IUCN (Díaz and Barquez, 2008) and the only known specimen is from Yuto locality, Jujuy Province, Argentina (Díaz *et al.*, 2002).

*Cryptonanus chacoensis* records are well known from Paraguay, southern Bolivia, northern Argentina (Voss *et al.*, 2005; Gardner, 2007), and putative citations are known from Mato Grosso do Sul State (e.g., Rossi *et al.*, 2006; Cáceres *et al.*, 2008a) and possibly south of the Rio Grande do Sul State (Gardner, 2007); consequently, the occurrence of *C. chacoensis* in the Triângulo Mineiro region, west of Minas Gerais State, considerably extends the geographic range of this species. In addition, this is the first Brazilian record of *C. chacoensis* in the Cerrado of Minas Gerais State. The other species, *C. agricolai* was recorded in the Minas Gerais State from the Lagoa Santa locality (north to the Belo Horizonte city) that is about 400

km east from the Peirópolis locality. Despite both species share a similar size and several osteological cranial features (Voss *et al.*, 2005), the presence of an incomplete anterior cingulum on the M<sup>3</sup> in the specimens from Peirópolis suggests their assignation to *C. chacoensis*. This species is sympatric at least with *Gracilinanus agilis* in the studied locality. The presence of *C. chacoensis* in Triângulo Mineiro also suggests a more continuous distribution north to the frontier of Paraguay and Argentina, where several reports were recognized (see Voss *et al.*, 2005: Figure 7; Gardner 2007: Map 15).

The diversity and natural history of *Cryptonanus* species are still poorly understood resulting frequently in ambiguous assignations and possibly obscures a higher diversity than previously thought (see Cáceres *et al.*, 2008a: 323). As such, new records and localities for these small didelphid marsupials would be useful to a better understanding of their taxonomy and natural history in Brazil.

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