



## PALEONTOLOGY

# A new record of Tayassuidae (Mammalia: Cetartiodactyla) from the Pleistocene of northern Brazil

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**Abstract:** In this contribution, we described a new fossil of a Pleistocene Tayassuidae from northern Brazil. The specimen is a left dentary with molars assigned to cf. *Pecari tajacu* recovered from an outcrop of the Rio Madeira Formation, State of Rondônia, Brazil. It represents the first Pleistocene fossil of this clade with stratigraphic provenance in the Amazon region of Brazil. This record contributes to the knowledge on the paleofauna of Rio Madeira Formation as well as extend the past geographic distribution of peccaries in South America.

**Key words:** Megafauna, paleobiogeography, Rio Madeira Formation, Rondônia.

## INTRODUCTION

The South American Tayassuidae encompasses the extant *Pecari tajacu* (Linnaeus 1758), *Tayassu pecari* (Link 1795), *Parachoerus wagneri* (Rusconi 1930), and several extinct species recovered from Pliocene-Quaternary strata of this continent (e.g., Rusconi 1930, Gasparini & Zurita 2005, Gasparini & Ferrero 2010, Gasparini 2011, Gasparini et al. 2009, 2011, 2014, Avilla et al. 2013, Montellano-Ballesteros et al. 2014, Parisi Dutra et al. 2017a; but see Frailey & Campbell 2012 and discussion in Parisi-Dutra et al. 2017a,b). According to Parisi-Dutra et al. (2017a), the Quaternary fossils include records of the three extant taxa, plus the extinct *Platygonus* Le Conte 1848, that surpassed the Pliocene/Pleistocene boundary; *Catagonus* Ameghino 1904, with two extinct species: *C. metropolitanus* Ameghino, 1904 (Early Pleistocene, Argentina) and *C. bonaerensis* Ameghino, 1904 (Middle Pleistocene?-Late Pleistocene/Early Holocene,

Argentina and Uruguay); and *Brasiliochoerus stenocephalus* (Lund in Reinhardt 1880) (Middle Pleistocene-Late Pleistocene/Early Holocene, Brazil, Argentina, Bolivia, and Uruguay) (see Gasparini et al. 2009, 2013, 2014, 2019, Gasparini & Ubilla 2011, Parisi-Dutra et al. 2017a). In this communication, we report a tayassuid fossil exhumed from Pleistocene beds of the Rio Madeira Formation, Rondônia, Brazil, which represents the first record of peccaries with stratigraphic provenance from the Amazon region of Brazil.

## MATERIALS AND METHODS

### Geological and paleontological context

The specimen UFSM 11606 was found in a project of paleontological rescue during the construction of the Jirau Hydroelectric Powerplant, Rondônia, Brazil, located around 120 km of Porto Velho (Fig. 1). The fossil was recovered from a conglomeratic deposit (“mucururu”; see Costa



**Figure 1. Geographic location of the Rio Madeira Formation (Pleistocene), State of Rondônia, Brazil.**

1991) of the Rio Madeira Formation, located at Ilha da Formiga (9°16'15,29" S; 64°39' 53,87" W). The fossiliferous levels of this formation were originated by a fluvial system (see Quadros et al. 2006) during the latest Middle Pleistocene/ Late Pleistocene (radiocarbon dating: ~27 ka BP and > ~46 ka BP; Rizzotto et al. 2006; Accelerator Mass Spectrometry, Thermoluminescence, and Optically Stimulated Luminescence: 130,000 to 9,000 years BP; Da-Rosa et al. 2012)

The Pleistocene fossils from northwestern Brazil (see Simpson & Paula-Couto 1981, Paula-Couto 1983, Ranzi 1999, 2000) are important to understand the origin of the modern Amazon biota. With the intense mining activity in the State of Rondônia, since the 1980s, several fossils have been discovered in the Rio Madeira Formation, including records of *Eremotherium* (Megatheriidae), *Holmesina*

*rondoniensis* (Pampatheriidae), *Glyptodon clavipes* (Glyptodontidae), *Toxodon* aff. *platensis* (Toxodontidae), *Tapirus rondoniensis* (Tapiridae), *Inia* (Cetacea), *Trichechus hesperamazonicus* (Trichechidae), and *Neochoerus* aff. *sulcidens* (Caviidae) (Adamy & Pereira 1991, Cozzuol 1999, Holanda et al. 2011, Cozzuol et al. 2005, 2006, Nascimento 2008, Góis et al. 2012, Perini et al. 2020).

### Institutional abbreviations

**UFSM**, paleontological collection of the Laboratório de Estratigrafia e Paleobiologia of the Universidade Federal de Santa Maria, Santa Maria, Brazil.

## RESULTS AND DISCUSSION

### Systematic paleontology

Cetartiodactyla Montgelard, Catzeflis and Douzery 1997

Suiformes Jaekel 1911

Suoidea Gray 1821

Tayassuidae Palmer 1897

cf. *Pecari tajacu* (Linnaeus 1758)

**Referred material:** UFSM 11606, left dentary with m1-m3. A 3D model of the specimen is available in Copetti et al. (2020a).

**Geographic and stratigraphic provenance:** Rio Madeira Formation (Pleistocene), Rondônia, Brazil.

**Description:** UFSM 11606 is a left dentary preserving the m1-m3 (Fig. 2). The specimen preserves the body of the dentary, but the symphysis and the vertical mandibular ramus are missing. There is a small portion of the coronoid process located posteriorly to the m3 (Fig. 2a-b). The ventral margin is slightly convex at the middle portion, becoming rectilinear at the level of the premolars. Anteriorly to the preserved portion of the angular process, there

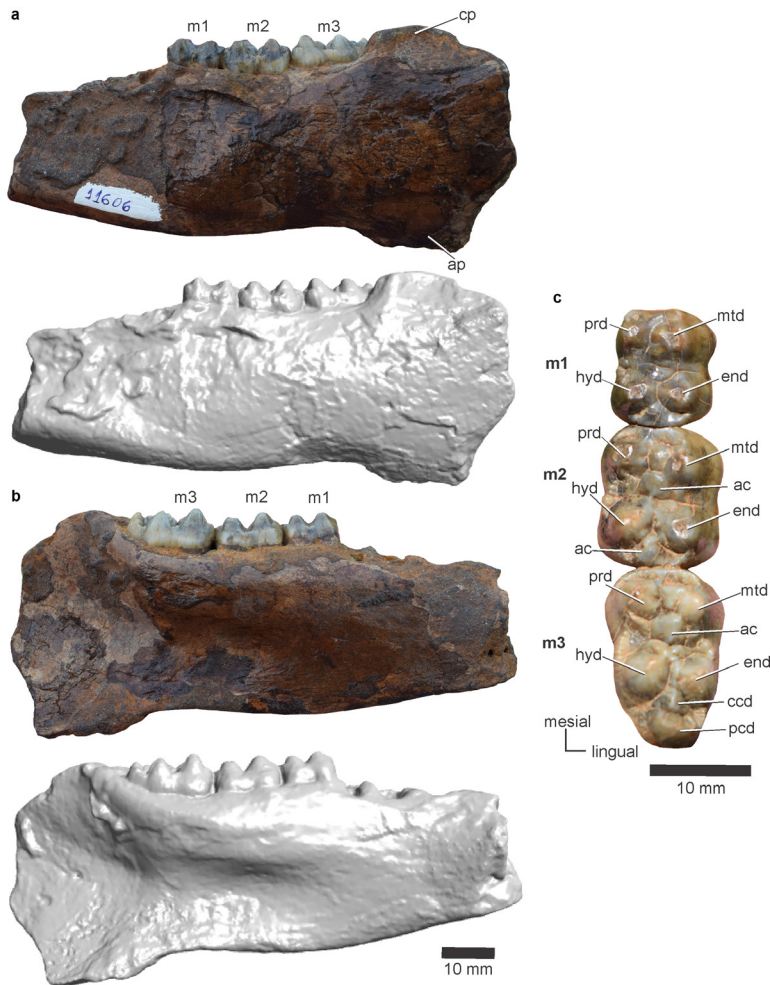
is a concavity on the ventral margin of the dentary (Fig. 2a).

The teeth are brachydont and bunodont, showing four main cusps: protoconid and metaconid mesially, separated by a valley from the hypoconid and entoconid distally, which have little wear (Fig. 2c). The m1 and m2 display rectangular outline in occlusal view (Fig. 2c). In occlusal view, a slight constriction at the middle portion of the teeth can be observed. The m3 is mesiodistally more elongated, with subrectangular outline due to the presence of a third lobe (Fig. 2c).

The m1 shows four worn main cusps (protoconid and metaconid mesially, separated

by a valley from the hypoconid and entoconid distally). This tooth, which is the smallest of the series, shows mesial and distal cingula. Other conulids are not present due to the wear of the tooth (Fig. 2c).

The m2 shows more wear on the protoconid, metaconid, and entoconid than on the hypoconid (Fig. 2c). Like the m1, this tooth shows a cingulum labiolingually extended in the mesial and distal regions of the tooth. In the center of the tooth, distally to the protoconid and metaconid, there is an accessory cuspid at the middle portion of the cingulum. These structures are separated from the distal region of the tooth by a transverse valley. In the distal



**Figure 2.** Left dentary with m1-m3 of cf. *Pecari tajacu* (UFSM 11606) from the Rio Madeira Formation, State of Rondônia, in lateral (a) and medial (b) views, respectively; detail of the occlusal surface (c). Dental nomenclature follows Gasparini et al. (2011). Abbreviations: ac, accessory cuspid; ap, angular process; cp, coronoid process; end, entoconid; hyd, hypoconid; mtd, metaconid; prd, protoconid; ccd, central conulid; pcd, posterior conulid.

region, the hypoconid is located labially, the entoconid lingually, and an accessory cuspid distally to both conids at the middle line of the tooth (Fig. 2c).

The m3 is the least worn tooth of the series, and the cusps are sharper than in the m1 and m2 (Fig. 2c). Mesially, there is a marked cingulum, while labial and lingual cingula are not well developed. The protoconid and metaconid are well developed, and distally to them, there is an accessory cusp. The m3 shows an unworn third lobe, in which two main conulids can be observed, the central and distal ones (Fig. 2c).

*Dimensions.* m1: mesiodistal length (mdl) – 12.50 mm; labiolingual width (llw) – 7.86 mm; m2: mdl – 14.15 mm, llw – 9.23 mm; m3: mdl – 18.37 mm, llw – 9.41 mm.

### Morphology and taxonomy of UFSM 11606

The body of the dentary of UFSM 11606 is lower than *B. stenocephalus* and similar to *T. pecari* and *P. tajacu*. The ventral margin is slightly convex at its middle portion, differing from *B. stenocephalus*, in which the ventral margin is almost rectilinear (Copetti et al. 2020b). The mandible and molars of *T. pecari* and *P. tajacu* are quite similar. However, some traits present in UFSM 11606 have been employed to differentiate them. According to Frailey & Campbell (2012: Fig. 10), the mandible of *T. pecari* shows the middle ventral outline of the dentary slightly convex, becoming rectilinear at the ventral margin of the symphysis, while the dentary of *P. tajacu* is convex at the middle portion of the ventral margin, becoming rectilinear at the level of the premolars. In this sense, UFSM 11606 share the same pattern with *P. tajacu*.

The molars are brachydont and bunodont, not high-crowned as *P. wagneri* and *B. stenocephalus*. The lower molars have similar occlusal morphology, but according to Woodburne (1968) they have some differences

in proportions concerning the mesiodistal length (mdl) and labiolingual width (llw) of the m1 (*T. pecari* – mdl: 14-16.25 mm, llw: 10.9-14.4 mm; *P. tajacu* – mdl: 10.3-13.3 mm, llw: 8.80-10.80 mm; UFSM 11606 – mdl: 12.50 mm, llw: 7.86 mm), mesiodistal length of the m2 (*T. pecari*: 15.15-18.35 mm; *P. tajacu*: 12-14.95 mm; UFSM 11606: 14.15 mm), and labiolingual width of the m3 (*T. pecari*: 12.65-16.20 mm; *P. tajacu*: 9.45-12.40; UFSM 11606: 9.41 mm). Following Woodburne (1968), UFSM 11606 falls in the size range predicted to *P. tajacu*. The distal region of the m1 and m2 of *T. pecari*, where the accessory cusp is located (see Gasparini et al. 2011), projects more distally than in UFSM 11606.

However, these mentioned traits present in UFSM 11606 are very subtle to assign the specimen confidently to *P. tajacu*, because they can be variable during the ontogeny (see Montellano-Ballesteros et al. 2014), and the most diagnostic features are present in the premolars (see Woodburne 1968, Gasparini & Zurita 2005). Hence, we employed the use of cf. to identify the specimen from Rio Madeira Formation.

### Final remarks

The specimen UFSM 11606 is assigned to cf. *Pecari tajacu*, the collared peccary. This fossil represents the first record of a Pleistocene tayassuid with stratigraphic provenance in the Amazon region of Brazil. Besides that, it contributes to the knowledge on the paleofauna of Rio Madeira Formation as well as extend the past geographic distribution of peccaries in South America. Although a fossil of *T. pecari* was mentioned for the State of Amazonas (Ranzi 1999), the data on collection and morphology are unavailable (Gasparini et al. 2014).

The available features present in UFSM 11606 resembles *Pecari tajacu* regarding size and mandible outline. This tayassuid has the largest geographic distribution among extant

species, recorded from north-central Argentina to the southwestern USA. In South America, the collared peccary is recorded in deposits from the Middle Pleistocene to Holocene from Argentina (Buenos Aires Province), Brazil (States of Minas Gerais, Tocantins, Ceará, Paraná, and Rio Grande do Norte), Peru (Tumbes Department), and Venezuela (Falcón and Zulia States) (see Fonseca 1979, Dias-da-Silva et al. 2010, Gasparini 2011, Gasparini et al. 2014, Montallenos-Ballesteros et al. 2014).

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