

## **New records of *Tolypeutes tricinctus* Linnaeus, 1758 (Cingulata: Tolypeutinae) in northern Minas Gerais state, Brazil**

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### **Abstract**

In this work we present the first record of *Tolypeutes tricinctus*, the three-banded armadillo, in the state of Minas Gerais, Brazil. These data confirm previous modeling studies and field observations that suggest the occurrence of the species for these areas of Cerrado and Caatinga in the northern part of the Minas Gerais. Additionally, it contributes further to the elaboration of new management plans for the fauna of the region that is adjacent to the Grande Sertão Veredas National Park.

**Keywords:** Three-banded armadillo, Geographical distribution, Grande Sertão Veredas National Park, Conservation, Species distribution.

The genus *Tolypeutes* (Illiger, 1811) is composed of the species *Tolypeutes matacus* (mataco or Chaco three-banded armadillo) and *Tolypeutes tricinctus* (Caatinga three-banded armadillo). Three-banded armadillos present unique characteristics among the Dasypodidae, such as curling into a ball for protection against predators (Sanborn 1930; Wetzel et al. 2007) and their females have a true vagina (Cetica et al. 2005). They have carapaces with 3 to 4 mobile bands and their size is considered small when compared to other species of the Tolypeutinae subfamily. Its head-body length ranges from 210 to 300 mm, with a relatively short tail of about 65 mm, and its weight ranges from 1.0 to 1.6 kg in adults (Wetzel 1985; Marinho Filho et al. 1997; Wetzel et al. 2007).

Both species of three-banded armadillo have allopatric distributions (Feijó et al. 2015). *Tolypeutes matacus* has a wider distribution, occurring in the western Cerrado of Brazil (Mato Grosso and Mato Grosso do Sul states) and in the Chaco of Bolivia, Paraguay and Argentina (Wetzel et al. 2007). *Tolypeutes tricinctus* is endemic to Brazil, with much of its distribution associated with the Caatinga biome

(Moojen 1943; Coimbra-Filho 1972; Silva & Oren 1993; Santos et al. 1994; Oliveira 1995; Wetzel et al. 2007) and some adjacent areas of Cerrado, including Goiás and Tocantins states, close to the border with the Bahia state (Marinho-Filho et al. 1997; Feijó et al. 2015). The southeastern highlands of Brazil have been indicated as probable areas of occurrence of *T. tricinctus* by Wetzel (1982) and also by potential distribution projections (Anacleto et al. 2006; Zimbres et al. 2012; Feijó et al. 2015). Although the Red List of the Brazilian fauna (ICMBIO 2018) mentions the occurrence of the three-banded armadillo in the Grande Sertão Veredas National Park (GSVNP), the reference used by these authors rather indicates the presence of this species in the Peruaçu and Jaíba valleys of the Minas Gerais state (Paula et al. 2011). However, the technical report of Paula et al. (2011) presents no physical evidence about the *T. tricinctus* individuals reported in the state. According to the red lists of IUCN (Miranda et al. 2014) and Brazil (Reis et al. 2015), this species is in danger of extinction and classified as Vulnerable (VU), although it needs more knowledge about its biology and distribution for the development of more effective conservation actions (Reis et al. 2015, Feijó et al. 2015, Superina & Abba 2020).

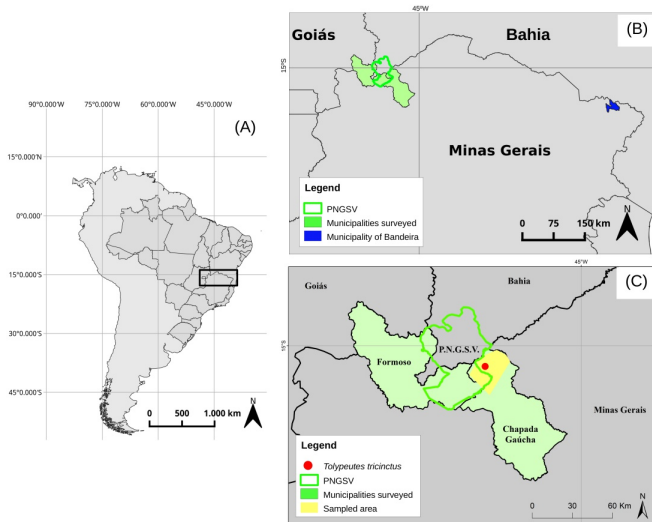


Figure 1: Points of occurrence of *Tolypeutes tricinctus* registered in Minas Gerais state. A) South America with emphasis on the border regions of northern Minas Gerais, northern Goiás and southern Bahia; B) Detailed section of map “A” with highlights for the Grande Sertão Veredas National Park (dark green line), municipalities covered by the park (light green) and the municipality of Bandeira, Minas Gerais state (blue); C) Detailed map with the geographic point of the photographic record of *Tolypeutes tricinctus* in the municipality of Chapada Gaúcha, Minas Gerais state, Brazil, close to the border region of the GSVNP (red dot).

This study describes the new records of the occurrence of *T. tricinctus* in northern Minas Gerais state, Brazil. Between 12th and 21st of November 2014, a field survey covered the Chapada Gaúcha and Formoso municipalities in the state of Minas Gerais (MG), including the Grande Sertão Veredas National Park and surrounding districts of “Estiva” and “Assentamento do Boi” (Figure 1). Active searches were carried out during day and night, mainly during peak hours of three-banded armadillo activity, between 2 and 6 PM and between 8 and 11 PM (Bocchiglieri 2010). Informal conversations with the residents of the surroundings of the GSVNP, photos of the armadillo were presented for their identification and better delineation of the search area. During the survey, a member of the fire-fighting crew of GSVNP revealed that they had recently found an individual with the characteristics of the species at coordinates S 15° 08' 294" and W 45° 38' 584" in the countryside of Chapada Gaúcha municipality, at 780 meters above sea level (Figure 1), with included photographs (Figure 2) that allowed the identification of the species as *Tolypeutes tricinctus*. The main characteristics that enabled the identification of the species were: the number of bands (Figure 2A) characteristic of the genus (Wetzel et al. 2007) the

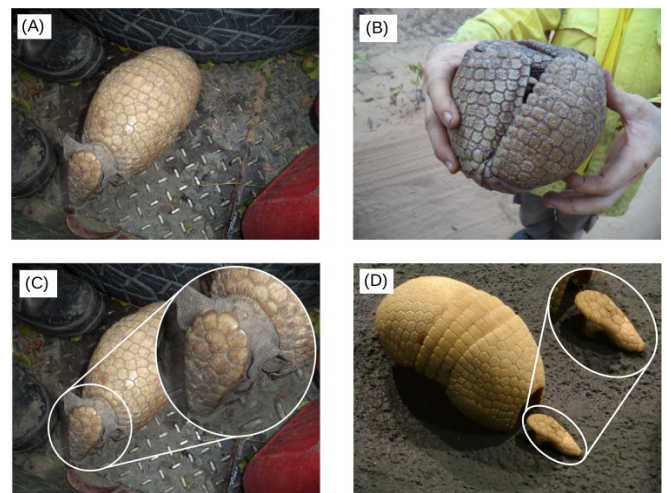


Figure 2: *Tolypeutes tricinctus* specimens recorded in the present study. A, B and C: *Tolypeutes tricinctus* found in the border region of GSVNP, northwestern Minas Gerais state; B: *Tolypeutes tricinctus* curling into a ball as a defense strategy; C: Highlight of the characteristic pattern of the cephalic shields of the *T. tricinctus* specimen; D: *Tolypeutes tricinctus* specimen collected in the city of Bandeira, northeastern Minas Gerais state, currently on display at the Natural History Museum of PUC-MG, highlighting the characteristic pattern of the cephalic shield on the head.

unique ability to curl into a ball (Figure 2B) (Sanborn 1930; Wetzel et al. 2007), and the pattern of the cephalic shields, which differs from *T. matacus* basically by the presence of two pairs of cephalic shields (Figure 2C) instead of a single pair on the head (Garrod 1878).

After visual identification through the photographs, active searches were carried out in several regions close to the geographic point where the armadillo was found, but without success. In informal conversations, both researchers, residents and former hunters who have lived in the region for decades, stated that they had never seen individuals of this species in the region, which suggests that it is locally a very rare animal. This area is close to the borders with the states of Bahia and Goiás, where there are records of occurrence of the species in the Cerrado and Caatinga biomes, particularly in the Bahia state. Considering this evidence, added to interviews and studies of potential distributions of the species (Santos 1993; Anacleto 2006; Feijó et al. 2015), the species may extend to more points near the borders of these states with Minas Gerais that were not yet surveyed. For example, a specimen of *Tolypeutes* was collected in Caatinga areas of the Bandeira’s municipality, northeastern Minas Gerais state by Professor German A. Bohorquez Mahecha (personal communication) in 1987, and it is composed of a carapace that is

currently on exhibition at the Natural History Museum of PUC-MG (Belo Horizonte, MG, Brazil), with no voucher number (data were lost in a fire in 2013). The carapace allowed us to observe only the number of bands on its back and the characteristic pattern of cephalic shields on its head, which indicate to be *T. tricinctus* (Figure 2D) (Garrod 1978). Additionally, its location in the extreme south of the Caatinga biome, far from the historical and potential distribution of *T. matacus* (Feijó *et al.* 2015), indicates that it is indeed the Caatinga three-banded armadillo.

The phyto-physiognomy of the PNGSV, as well as its surroundings, is composed of a mosaic of cerrado woodlands, gallery forests, cerrado *stricto sensu*, veredas and “carrascos”, the latter considered a transitional characteristic between the Cerrado and Caatinga biomes (MMA/IBAMA/FUNATURA 2003), habitats where the species is normally found (Wetzel *et al.* 2007; Feijó *et al.* 2015). A niche-based modeling study of armadillo species (Anacleto *et al.* 2006) estimated the potential presence of *T. tricinctus* in Minas Gerais state, which was confirmed by the new record obtained in the present work.

Anacleto *et al.* (2006) and Zimbres *et al.* (2012) demonstrated the importance of increasing the number of Preservation Areas for the conservation of *T. tricinctus*. The new record in the border region of the Grande Sertão Veredas National Park reveals that this species possibly exists within the park boundaries in the Minas Gerais region. Given its vulnerability and importance as an “umbrella species” for the protection of other species that also share the same habitat, these data highlight the importance of reviewing the area covered by this park and/or the creation of new Preservation Areas in the region so that it encompasses as much as possible the areas where the species potentially occurs. Additionally, this data contributes to the National Action Plan for the conservation of the three-banded armadillo (PAN tatu-bola) of the Ministry of Environment of Brazil, which has as one of the objectives to detail the species' total distribution area (ICMBIO 2014).

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