

FIELD NOTE

Giant armadillo (*Priodontes maximus* Kerr, 1792; Cingulata: Chlamyphoridae) attacks nest of stingless bee *Trigona amalthea* (Olivier, 1789) (Hymenoptera: Apidae)

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Abstract The giant armadillo (*Priodontes maximus*) has a wide distribution in South America and is naturally rare and difficult to observe, which contributes to the little existing knowledge about its biology and natural history, especially in the Amazon. We report, for the first time, an attack on a nest and the predation of stingless bees *Trigona amalthea* by *P. maximus*, contributing to the knowledge of their diet in the wild.

Keywords: Amazon forest, diet, Meliponini, predation, wild

Ataque de tatu-canastra (*Priodontes maximus* Kerr, 1792; Cingulata: Chlamyphoridae) em ninho de abelha sem ferrão *Trigona amalthea* (Olivier, 1789) (Hymenoptera: Apidae)

Resumo O tatu-canastra (*Priodontes maximus*) tem uma ampla distribuição na América do Sul e é naturalmente raro e difícil de se observar, o que contribui para o pouco conhecimento existente sobre sua biologia e história natural, especialmente na Amazônia. Relatamos, pela primeira vez, o ataque a um ninho e a predação de abelhas sem ferrão *Trigona amalthea* por *P. maximus*, contribuindo para o conhecimento de sua dieta na natureza.

Palavras-chave: dieta, Floresta Amazônica, Meliponini, predação, selva

The giant armadillo (*Priodontes maximus* Kerr, 1792; Xenarthra: Cingulata: Chlamyphoridae) is the largest species of armadillo, weighing up to 60 kg and reaching over 1.30 m in total length (Sigrist, 2012; Carter *et al.*, 2016; Desbiez *et al.*, 2019). It is widely distributed in South America east of the Andes, but is usually rare and occurs in low densities (Sigrist, 2012; Carter *et al.*, 2016). Giant armadillos are found in several types of habitats, from forests to savannas, typically in natural areas far from human settlements; the presence of substantial food reserves seems to be decisive for the occurrence of the species. Observations of the species in nature

are rare, partly due to its nocturnal and fossorial habits, and the fact that animals can remain in their burrows for many hours and even days (Sigrist, 2012; Carter *et al.*, 2016; Desbiez *et al.*, 2019). It is considered Vulnerable by the International Union for Conservation of Nature (IUCN), with populations in decline especially due to hunting for meat (usually subsistence) and loss of habitat (IUCN, 2020).

The natural history and ecology of *P. maximus* is little known (Aya-Cuero *et al.*, 2015), and most of the knowledge about its biology and ecology is

based on observations made in the Cerrado (Anacleto & Marinho-Filho, 2001; Anacleto, 2007; Silveira *et al.*, 2009) and Pantanal of Brazil (Desbiez & Kluyber, 2013; Desbiez *et al.*, 2020), and the Llanos of Colombia (Aya-Cuero *et al.*, 2017). Information about Amazonian forest populations is practically nonexistent.

Priodontes maximus has a diet that consists almost exclusively of ants (Formicidae) and termites (*Cornitermes*), although it does feed occasionally on other invertebrates found in the nests of these insects. In a study conducted in the Cerrado of central Brazil, it was found that termites of the genus *Cornitermes* Holmgren, 1912 were the main prey consumed by giant armadillos (Anacleto, 2007). Reports of giant armadillos feeding on ants in the genus *Atta* Fabricius, 1805 suggest that they usually do not destroy an entire colony while feeding (Anacleto & Marinho-Filho, 2001; Sigrist, 2012; Carter *et al.*, 2016).

There are no records of attacks by *P. maximus* on nests of stingless bees (Insecta: Hymenoptera: Apidae: Meliponini), even though the nests are often built in the ground, in hollow trunks, exposed, or even in association with termite or anthills and, thus, would seem accessible to the armadillos (Roubik, 2006; Michener, 2007; Rasmussen & Camargo, 2008).

Even though stingless bees do not have the ability to sting, they use other defense mechanisms, such as soiling the enemy with plant resins, feces of other animals, acids, or biting (Roubik *et al.*, 1987;

Nogueira-Neto, 1997; Lehmborg *et al.*, 2007). The stingless bees of the genus *Trigona* Jurine, 1807, such as *T. amazonensis* (Ducke, 1916), *T. spinipes* (Fabricius, 1793), and *T. amalthaea* (Olivier, 1789), are known for their aggressive defense of the nest, as exemplified by the many workers that act as guards, and by attacking the enemy with bites (Shackleton *et al.*, 2015).

Trigona amalthaea generally builds its own nest (external type) with plant material mixed with resins, in which the outer layer is composed of chewed green leaves; when dried it resembles rotten trunks or termite nests (Wille & Michener, 1973). Occasionally, nests are built inside termite nests (Schwarz, 1948), or soil is used as an external involucrum (Rasmussen & Camargo, 2008).

Here we present the first documented observation of *P. maximus* preying on a nest of the stingless bee *T. amalthaea*.

The observation was made in the Serra do Divisor National Park (07°31'55.5"S, 73°43'38.9"W), a Conservation and Integral Protection Unit of 8,430 km², located in the municipality of Mancio Lima, in the far west of the state of Acre, Brazil.

Four individual bees were collected under the authorization of Sistema de Autorização e Informação em Biodiversidade – SISBIO (72686-1), identified, and later deposited in the Collection of Invertebrates of the Instituto Nacional de Pesquisas da Amazônia – INPA (Manaus, Amazonas, Brazil) (FIG. 1). The identification of the bees was performed using a Leica M165C stereomicroscope, coupled

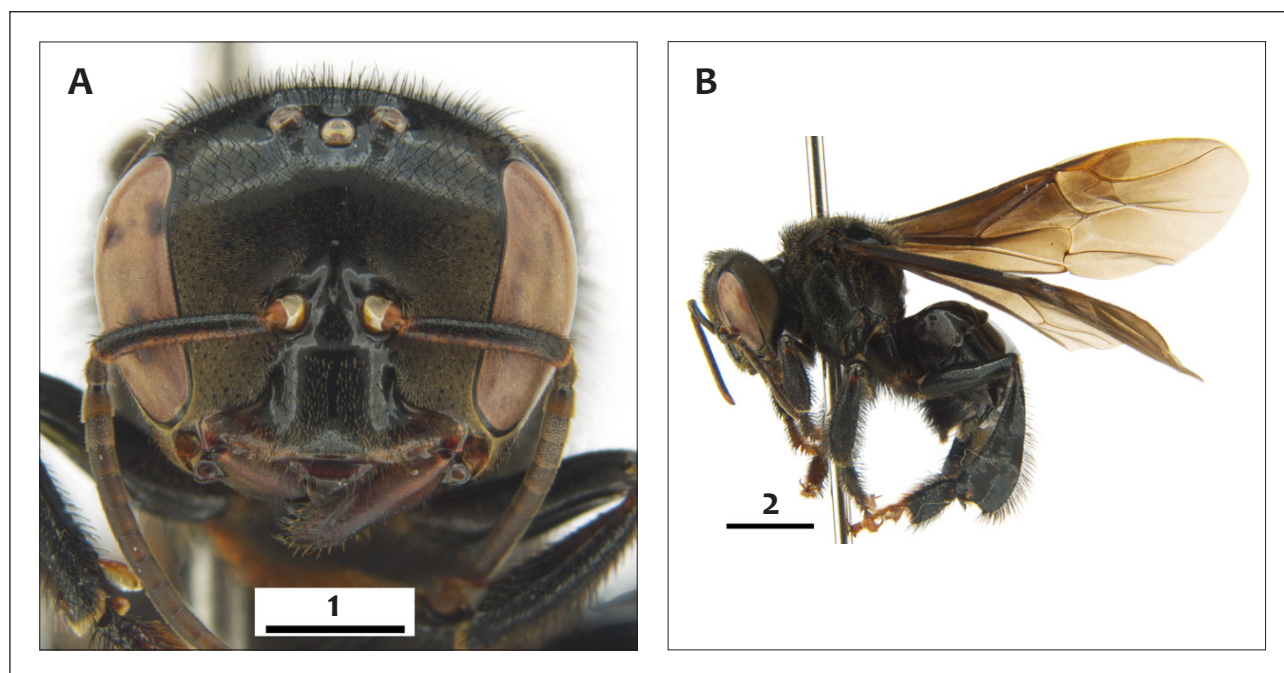


FIGURE 1. Worker of *Trigona amalthaea* (Olivier, 1789). A: Head in frontal view. B: Body in lateral view. Scale in millimeters. Photos: David Silva Nogueira.

with a Leica WILD M3Z digital camera. Images were captured using IM 50 software (Image Manager) and the images were merged by Auto-Montage. The identification was made by comparison with material deposited in the INPA Collection and previously identified by the stingless bee specialist J.M.F. Camargo.

Giant armadillos are known to occupy the area where the nest was located (Calouro, 1999). On 2 December 2019, at 7:44 hr, an adult *P. maximus* was observed walking near the edge of a dry land forest. The animal raised its body, leaning on its hind legs, and sniffed for a few seconds (FIG. 2). Upon entering the forest again, the giant armadillo used its front claws to begin opening a nest of *T. amalthea* that was on the ground.

The nest was located in a dense forest area and was of the exposed type, located above the ground, in leaf litter and between branches. Its external involucre was built with plant material and was very tough.

The nest was about the same size as the giant armadillo and was immediately defended by the bees, which flew in great numbers around the animal, landing all over its body and making bites. However, these attacks did not seem to disturb the predator, possibly due to its thick carapace. The *P. maximus* was observed removing pieces of the nest and inserting its tongue in the openings, consuming both adults and larvae (Melo, 2020). After about 20 minutes, the giant armadillo moved away from the nest and disappeared into the understory. The nest did not appear to be completely destroyed, because the attack was concentrated on one side. However, a closer inspection was not possible due to the defensive behavior of the bees, which continued to fly around the nest.

The observation we report here is consistent with other studies that have documented occasional, opportunistic feeding by giant armadillos on prey such as spiders (Aranea), scorpions (Scorpiones), cockroaches (Blattaria), beetles (Coleoptera), Diplopoda, worms, small snakes, and carrion (Anacleto & Marinho-Filho 2001; Carter *et al.*, 2016), or even leaves of grasses, seeds (Anacleto & Marinho-Filho, 2001), and figs (Wallace & Painter, 2013). Consumption of stingless bees by *P. maximus* reinforces the importance of Hymenoptera in its diet, but also suggests that the diet may be broader than has been thought. We believe this is the first observation of *P. maximus* feeding in the Amazon forest and, because stingless bees are common there, bees may represent an important portion of the giant armadillo diet in this biome.

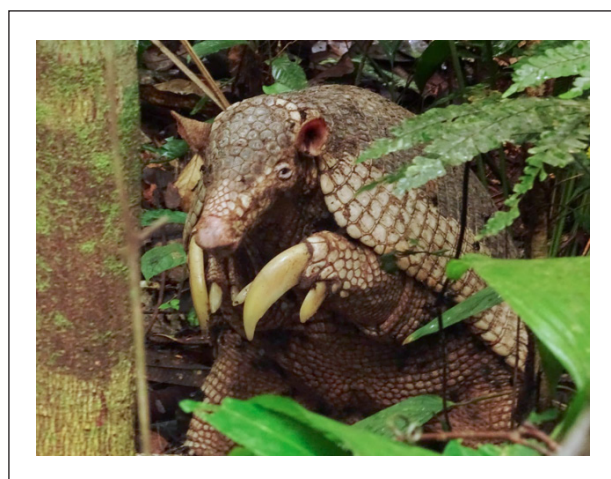


FIGURE 2. *Priodontes maximus* Kerr, 1792 resting on its hind legs and sniffing before locating the *Trigona amalthea* (Olivier, 1789) nest. Photo: Tomaz Nascimento de Melo.

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