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First report of predation of a smooth-fronted caiman (*Paleosuchus trigonatus*) by a Neotropical otter (*Lontra longicaudis*)

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ABSTRACT

Lontra longicaudis is a semi-aquatic predator which mainly feeds on fish and crustaceans, but which can opportunistically predate mammals, birds, and reptiles. In the Amazon, this species is sympatric with *Paleosuchus trigonatus*, one of the smallest species of crocodilians, whose possible means of defense is a very rigid skin, which causes adults to have few predators. Here we report the first documented case of predation of *P. trigonatus* by *L. longicaudis*.

KEYWORDS: Alligatoridae; Mustelidae; central Amazon; Brazil; diet

Primeiro relato de predação de um jacaré-coroa (*Paleosuchus trigonatus*) por uma lontra (*Lontra longicaudis*)

RESUMO

Lontra longicaudis é um predador semi-aquático com dieta principal a base de peixes e crustáceos, mas que oportunisticamente pode predar mamíferos, aves e répteis. Na Amazônia, essa espécie ocorre em simpatria com *Paleosuchus trigonatus,* uma das menores espécies de crocodilianos, apresentando como possível meio de defesa uma pele extremamente rígida, o que faz com que adultos tenham poucos predadores. Aqui nós relatamos o primeiro caso documentado de predação de *P. trigonatus* por *L. longicaudis*.

PALAVRAS-CHAVE: Alligatoridae; Mustelidae; Amazônia central; Brasil; dieta

The Neotropical otter, *Lontra longicaudis* (Olfers, 1818), is, along with the giant otter, *Pteronura brasiliensis* (Gmelin, 1788), one of two species of otter living in Brazil. *Lontra longicaudis* has a wide distribution in Central and South America (Sánchez and Gallo-Reynoso 2007; Rheingantz et al. 2014). This species can reach between 1.2 and 1.7 m in total length and weigh between 5 and 15 kg (Cheida et al. 2011). As they have a semi-aquatic habit, Neotropical otters depend strongly on water bodies, especially for foraging and feeding activities, and are usually found close to rivers, streams, lakes, ponds, estuaries, mangroves, swamps and along coastlines (Cheida et al. 2011; Rheingantz et al. 2014). This species also lives in habitats ranging from rocky shores to deciduous and perennial forests, tropical and temperate forests, and coastal savannah swamps (Cheida et al. 2011). Although Cheida et al. (2011) consider that the presence of otters is linked to the local availability of resources, Rheingantz et al. (2014) point out that the species can be found in environments with significant levels of anthropic impact.

Four species of crocodilians are sympatric with Neotropical otters in the central Amazon, including the smooth-fronted caiman, *Paleosuchus trigonatus* (Schneider, 1801) (Magnusson and Lima 1991; Morales-Betancourt et al. 2013). *Paleosuchus trigonatus* are among the smallest living crocodilians, reaching up to 2.3 m in total length, though males rarely exceed 1.7 m and most females are less than 1.4 m in total length (Magnusson and Lima 1991; Morales-Betancourt et al. 2013). Individual *P. trigonatus* have a small home range, spending most of the time in terrestrial shelters, close to small watercourses in adjacent forests and flooded areas. This species rarely moves away from these places (Magnusson and Lima 1991; Marioni et al. 2022). Diet studies indicate that 58% of their prey is terrestrial (Villamarín et al. 2017), a number linked to the fact that smooth-fronted caiman spend much of their life in the terrestrial environment (Magnusson and Lima 1991). Although it is a cryptic species, population density studies have indicated that *P. trigonatus* has the highest biomass per km² of any large predator in the central Amazon (Magnusson and Lima 1991).

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In September 2022 (dry season in the central Amazon), during birdwatching activity, AJS saw a smooth-fronted caiman (*P. trigonatus*) being attacked by an otter (*L. longicaudis*), in a stream approximately 5 m wide and 1 m average depth, with margins laterally unvegetated for approximately 3 m. The site (3°24'12.380"S, 64°42'26.284"W) consists of secondary vegetation in a stretch of buriti palmtrees (*Mauritia flexuosa* L.f.) surrounded by shrubs, where the stream crossed a dirt road. The site was approximately 1 km from a paved road, in an urban area of Tefé municipality, Amazonas state, Brazil, 600 km west from the state capital, Manaus (Figure 1).

At approximately 08:00 a.m., an adult Neotropical otter was observed leaving the stream and entering the riparian forest. Shortly afterwards, at a nearby point, bubbles and movement were observed in the watercourse, then the otter emerged dragging a smooth-fronted caiman, whose throat it was biting (Figure 2). The total length of each animal was similar (around 1 m). It was not recorded whether the attack began on land or in the water. While immobilized, the caiman made death roll attempts, both on and below the water surface. The otter emerged without the caiman, before diving and recovering it shortly after that. Some 5 minutes after the initial sighting, the caiman was dead and carried into the forest by the otter (Figure 3). After this, visual contact was lost.

Otters usually catch their prey under water, subsequently eating it on the water surface, or on land (Cheida et al. 2011). Neotropical otters are considered opportunistic predators and specialists in aquatic prey which moves slowly and has limited capacity to escape (Pardini 1998; Quadros and Monteiro-Filho 2001; Rheingantz et al. 2017). Fish and crustaceans are the most common prey of Neotropical otter (Pardini 1998; Quadros and Monteiro-Filho 2001), although they may also opportunistically feed on small mammals, birds, and reptiles (Passamani and Camargo 1995; Platt and Rainwater 2011; Santiago-Plata et al. 2013), as well as insects, amphibians and mollusks (Quadros and Monteiro-Filho 2001; Casariego-Madorell et al. 2008; Carvalho-Junior et al. 2010; Rheingantz et al. 2011). Otter diets may be more diverse in less stable environments or when main prey density is low (Rheingantz et al. 2017). The diversity and abundance of fish assemblages in Amazonian streams, including otter prey species, is influenced by vegetation type and riverbed substrate, in addition to seasonal changes promoted by variation in water level and rainfall (Espírito-Santo et al. 2009; Kemenes and

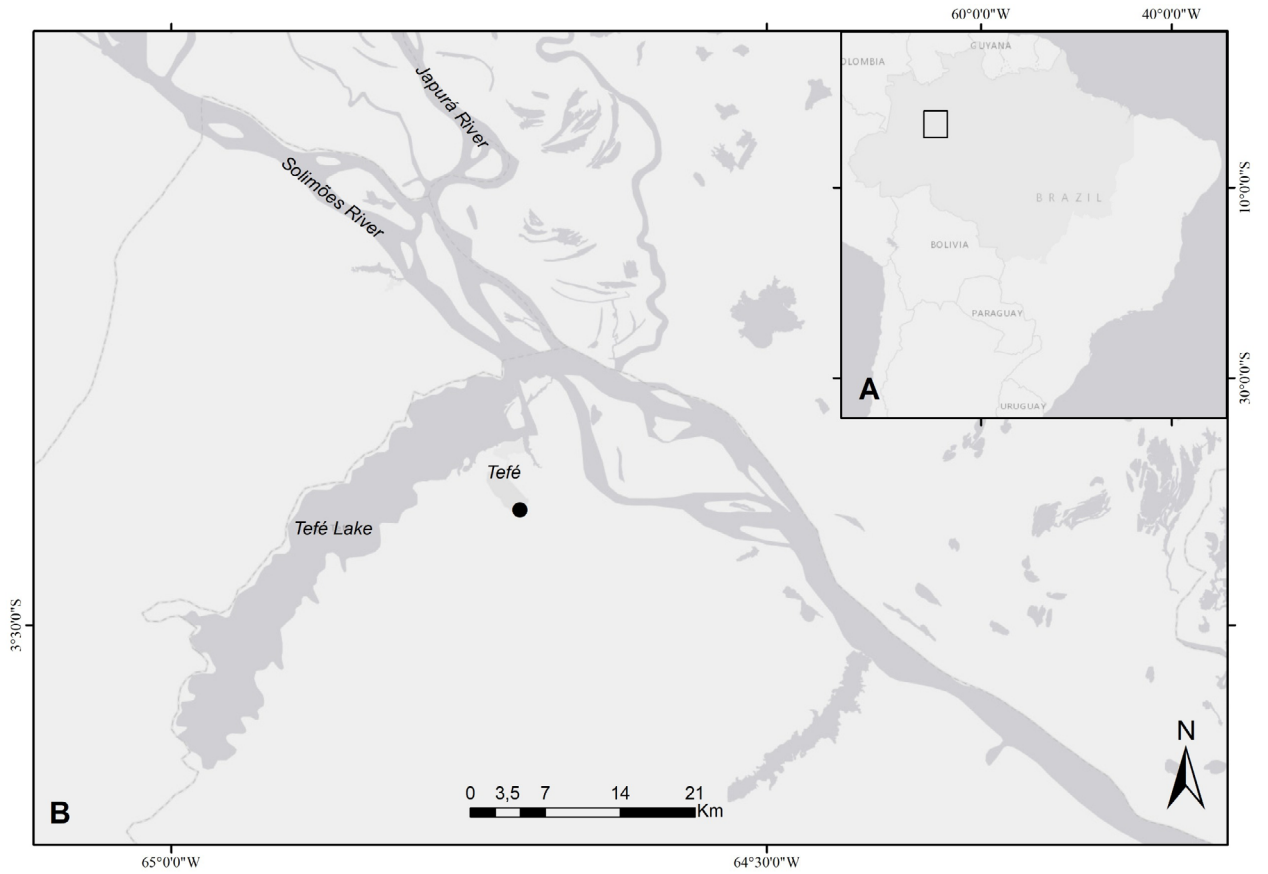

Figure 1. A – Location of the study area in the Brazilian Amazon (darker grey); B – Study area showing the location of the predation event on the outskirts of the city of Tefé, Amazonas state, downriver of the confluence of the Solimões and Japurá rivers.

Figure 2. Adult individual of *Lontra longicaudis* attacking a subadult *Paleosuchus trigonatus* in a stream in the municipality of Tefé, Amazonas state, Brazil. Credit: Anselmo J Silva.

Figure 3. Adult individual of *Lontra longicaudis* carrying a predated subadult *Paleosuchus trigonatus* out of the stream into the riparian forest in the municipality of Tefé, Amazonas state, Brazil. Credit: Anselmo J Silva.

Forsberg 2014). The stream where the predation occurred was shallow and narrow during the dry season, in addition to being approximately 8 km away from the largest water body (Tefé lake), which may have reduced the abundance of larger fish. Changes in the water level of streams also influence niche partitioning by some species of predators, as reported for *P. palpebrosus* and *P. trigonatus* by Marioni et al (2022). With the reduction in water level of the stream, *L.longicaudis,* besides having fewer prey options, probably had increased home-range overlap with *P.trigonatus* (Magnusson and Lima 1991; Marioni et al. 2022), increasing the chance of interspecific interactions.

Juvenile and subadult smooth-fronted caimans are potentially predated by felids, birds of prey, constricting snakes, other crocodilians, rodents, and freshwater turtles. However, adult animals supposedly have few predators (Morales-Betancourt 2013). According to reproductive biology studies of *P. trigonatus*, animals around 1 m in total length are still subadults, but close to sexual maturity (Magnusson and Lima 1991; Marioni et al. 2022). As one of the smallest and most terrestrial of crocodilians, one of their forms of defense consists of a high density of osteoderms on their skin and large irregular scales, which form a rigid carapace (English 2017). However, the otter attacked the least protected areas of the caiman body, such as the throat and side of the neck.

More recent research has suggested that this dense ossification may actually be an adaptation of dwarf crocodilian species to equatorial environments, functioning mainly as a calcium reserve and for thermoregulation (Clarac et al. 2024). As an additional defense strategy, they can perform the death roll when they are captured, as was observed during the current event. A death roll consists of spinning around the long axis of the own body, a behavior used by crocodilians to divide their prey into smaller fractions, or to injure or escape from a rival or predator during conflict (Drumheller et al. 2019).

There are reports of otter predation on smaller reptiles, such as adult iguanas (Pereira et al. 2020), juvenile turtles (Platt and Rainwater 2011) and juvenile spectacled caiman (Medina-Barrios and Morales-Betancourt 2015), however, this is the first record of Neotropical otter predation on a large subadult smooth-fronted caiman.

Our observation includes the Neotropical otter as potential predator of subadult and adult *P. trigonatus*, and highlights the need for further studies on the interaction between sympatric predators in Amazonian environments.

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