

SHORT COMMUNICATION

AMAZONIAN MANATEES (*Trichechus inunguis*) INHABITING AN EQUATORIAL METROPOLIS: HISTORICAL RECORDS AND MATING ACTIVITY NEAR BELÉM, NORTHERN BRAZIL

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ABSTRACT

The West Indian manatee *Trichechus manatus* Linnaeus, 1758 and the Amazonian manatee *T. inunguis* (Natterer, 1883) occur in the Marajó Bay area and in the inlets and channels near Belém. The Amazon Aquatic Mammal Study Group (GEMAM) coordinates a collaborative network for trapped and rescued manatees along the coast of the state of Pará and in the interior of Belém. The presence of the Amazonian manatee is confirmed with the rescue and sightings in the great Belém area. The samples of these manatees are housed in collections of institutions such as MPEG and ICMBio, CMA. On October 31st 2021, Amazonian manatees were sighted swimming near a beach in the Mosqueiro district, in greater Belém. Residents and tourists took images that show a mating behavior reported in the literature for *Trichechus* spp. The waters in this area are turbid and these records are a significant opportunity to understand this behavior. The event may suggest that Amazonian manatees are returning to the Belém area and its surroundings, as well as to the east coast of the state of Pará, possibly due to the synergic effects of SARS-CoV-2, providing areas less disturbed by humans, pandemic and the current climate change scenario, which would be a hope for this endangered species.

Keywords: Sirenia, Amazon coast, mating behavior, threatened species.

RESUMO**Sobre a presença do peixe-boi amazônico (*Trichechus inunguis*) próximo à Belém: registros históricos e atividade reprodutiva**

O peixe-boi das Índias Ocidentais *Trichechus manatus* Linnaeus, 1758 e o peixe-boi-amazônico *T. inunguis* (Natterer, 1883), ocorrem na Baía do Marajó e nas enseadas e canais próximos de Belém, Pará, Brasil. O Grupo de Estudos de Mamíferos Aquáticos da Amazônia (GEMAM) coordena desde 2005 uma rede colaborativa de informações sobre peixes-bois avistados e encalhados vivos ao longo do litoral do estado do Pará, incluindo os arredores e arquipélago de Belém. A presença do peixe-boi amazônico é confirmada por meio do resgate de diversos exemplares nas proximidades da grande Belém e registros visuais realizados durante monitoramento da área. As amostras desses peixes-bois estão alojadas nas coleções do MPEG e ICMBio, CMA. Em outubro de 2021, peixes-bois-amazônicos foram avistados nadando muito próximo a uma praia no distrito de Mosqueiro, em Belém. Moradores e turistas fizeram imagens que evidenciam o comportamento de acasalamento relatado na literatura para *Trichechus* spp. As águas nessa área são normalmente muito turvas, e estes registros representam uma ótima oportunidade para entender esse comportamento. O recente evento de acasalamento sugere que os peixes-boi-amazônicos estão reocupando toda a região da grande Belém e seus arredores, bem como o litoral leste do estado do Pará. Os efeitos sinérgicos da pandemia de SARS-CoV-2, com a diminuição de pessoas nas praias, e o cenário atual de mudanças climáticas podem estar agindo combinadamente, o que seria uma esperança para esse sirênio ameaçado de extinção.

Palavras chave: Sirenia, litoral amazônico, cópula, espécie ameaçada.

INTRODUCTION

Amazonian manatees (*Trichechus inunguis*) (Natterer, 1883) are endemic to the Amazon River Basin, distributed from river headwaters in Colombia, Peru and Ecuador up to Marajó Island, in Brazil (Best, 1984). Manatee records for the Brazilian state of Pará date back to the first centuries following Brazil's discovery, always comprising hunting reports until the mid-19th century, indicating great abundance of these aquatic mammals (Vieira & Brito, 2017). Subsistence hunting records are also noted for the Amazon basin and the northern coast of Brazil in the 2000s (Luna *et al.* 2000; Luna *et al.*, 2008a).

The study conducted by Luna *et al.* (2008b; 2008c) based on interviews describes the occurrence of *Trichechus manatus* Linnaeus, 1758 and *T. inunguis* (Natterer, 1883) on Marajó island and the left side of Marajó Bay. In that respect, the non-governmental organization (NGO) *Bicho D'água Institute*, alongside the Museu Paraense Emílio Goeldi (MPEG), the Fundação Oswaldo Cruz (Fiocruz) and the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), have been carrying out conservation efforts for these animals in the state of Pará, seeking to record occurrence areas and threats. When necessary, these institutions have also contributed to the rescue and rehabilitation of stranded and entangled manatees, aiding in their conservation and proposing public policies for the region.

In this context, Bonvicino *et al.* (2020) recently reviewed records on South American manatees, confirming their occurrence near Belém, Pará's state capital, and the surrounding Marajó Bay. Based on local reports, Luna & Passavante (2010) mention the occurrence of both species of manatees in eight villages near Belém, comprising Mosqueiro, Vigia, Colares, Joanes, Salvaterra, Soure, Camaleões Island and Mexiana Island.

Recent records of Amazonian manatees have been so far confirmed at the Marajó Bay area and nearby greater Belém inlets and channels, including Furo das Marinhas (01°21'4" S, 47°34'20" W), Mosqueiro (01°9'49" S, 48°28'15" W), and Ourém (01°33'0" S, 47°6'0" W) (Figure 1).

Currently, four *T. inunguis* specimens sampled in the vicinities of Belém are housed at the Pará

Museu Paraense Emílio Goeldi, obtained at the mouth of Igarapé Tucunduba, Guamá River (MPEG 11298), Icoaraci (MPEG 1518), Abaetetuba (MPEG 42148) and Arapiranga Island (collection number not available). In addition, a young male *T. inunguis* was recorded as caught by a small gillnet set off Furo das Marinhas, in Santa Bárbara do Pará, on 23rd June 2017. It survived the event and after a short rehabilitation period in Belém, was released at the same spot where it was found. He was named Tito, and his field number is GEMAM 748 (after the Amazon Aquatic Mammal Study Group, *Grupo de Estudos de Mamíferos Aquáticos da Amazônia* – GEMAM/MPEG).

Since November 2005, the GEMAM coordinates a collaborative network of investigators and volunteers to search for stranded and live-rescued manatees along the Pará state coastline, including Marajó Bay, Eastern Pará state coast and inland Belém area. As a result, GEMAM was informed on October 31st 2021, of a group of manatees sighted by locals and tourists swimming close to a beach sand strip named Praia do Bispo, in the district of Mosqueiro, Belém (Figure 1). The group of manatees was observed for approximately 60 minutes while filmed by hundreds of *voyeurs*, as they were reported by locals as being on a 'honeymoon' or 'in great love'. The group of manatees were described as 'a ball of tails and heads water-rolling'. In fact, the filming depicts a typical 'manatee ball', a mating behavior reported in the literature for *Trichechus* spp. (Hartman, 1979) by three supposedly adult manatees, who were presenting typical courtship behavior (Figure 2). It should be noted that this conduct has been previously reported for Amazonian manatees (Carvalho *et al.*, 2017). Interestingly, the manatees did not show any distress behavior during their activity although people crowded the beach to observe such an unusual scene. Best (1982) reported that temporary aggregations of Amazonian manatees can occur during the dry season, the alleged reproductive period. The mating system is of the promiscuous type, although there are strategies such as guarding a male to prevent access by other males to the female in estrus (Berta *et al.*, 2006).

The Antillean manatee is also promiscuous and forms mating groups composed of a female in heat and several adult males, creating a reproductive

aggregation that can last from a week to a month. During the cycle, the female mates with several males (Reynolds III *et al.*, 2004).

The videos, widely publicized in the local and national media, clearly suggest that mating took place, as one large manatee held the alleged female for more than 2 minutes (Figure 3). The third manatee remained nearby and, at least for several minutes, did not attempt to join/rejoin the group.

Male manatees (*Trichechus* spp.) can engage in aggressive behavior and competition for receptive females (Hartman, 1979). This is in agreement with the reported behavior known as ‘manatee riding’ by residents of the Amazon basin (Pereira,

1944). During the same week, professionals from the local Fire Brigade and other Mosqueiro village traders and residents were interviewed by the *Bicho D’água* team. The interviewees reported that it is not common for manatees to remain so close to the beach at this location, but also that these animals have been seen in the region more frequently in recent years. The firefighters also informed that they believe that the manatees remained during the entire period close to the observing humans because they were ‘trapped’ in a shallower area due to the low tide. In fact, when the tide came in, they left, moving away from the beach. During the interview, information on manatee feeding areas

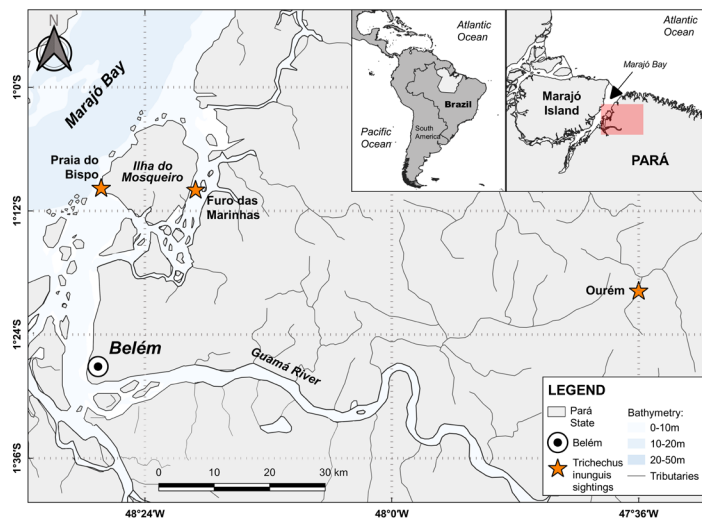


Figure 1. Amazonian manatee records near greater Belém inlets and channels: Furo das Marinhas, Mosqueiro and Ourém.



Figure 2. Mating herd of Amazonian manatees (*Trichechus inunguis*) filmed on Bispo Beach, Mosqueiro Island, near Belém, Pará, Brazil, 31st October 2021. Images captured from popular videos.



Figure 3. Mating herd of Amazonian manatees (*Trichechus inunguis*) filmed on Bispo Beach, Mosqueiro Island, near Belém, Pará, Brazil, 31st October 2021. Note the so-called ‘manatee ball’, as usually reported by fishers and locals for mating groups of manatees. Images captured from popular videos.

was obtained, such as the native vegetation banks that comprise part of the known diet for the species. Regarding their appearance in shallows Mosqueiro waters, Bonvicino *et al.* (2020) commented that the affluence of the enormous amount of freshwater during the Amazonian rainy season (December-June) may favor the spread of Amazonian manatees throughout the Belém coastline and adjacent islands. This environment provides abundant vegetation for manatee foraging, including *Avicennia nitida*, *Rhizophora mangle*, *Laguncularia racemosa*, *Montrichardia arborescens*, *Spartina brasiliensis*, *Eichhornia crassipes* and *Eleocharis interstincta* (Best, 1981; Best & Teixeira, 1982; Guterres-Pazin *et al.*, 2014) (Figure 4).

Manatees strongly depend on the local Amazon hydrology, which leads to seasonal increased and decreased river water levels, directly affecting manatee aquatic macrophyte food sources and, consequently, reproduction events (Cantanhede *et al.*, 2004; Arraut *et al.*, 2010). Mosqueiro Island is directly influenced by the Pará River estuary processes, which are governed by the seasonal variability of other river basins, such as the Guamá, that bathes the city of Belém (Prestes *et al.*, 2020), and local tides. River discharges and tides control two important processes in the estuary, saline intrusion (Rosário *et al.*, 2016) and suspended sediment transport (Carneiro *et al.*, 2020). The tide is

characterized by the macrotidal regime at the mouth of the estuary, with amplitudes of 5 meters (Prestes *et al.*, 2017), in the region that comprises Marajó Bay. The tides lose amplitude above the estuary, reaching around 3 meters near Belém (Rosário *et al.*, 2016; DHN, 2021), as well as around Mosqueiro island, becoming a mesotidal regime.

The Pará River estuary region is subjected to two rainfall regimes, where the wet season starts in December going until June, and the drier season occurs from July to January, with peaks between September and November (Moraes *et al.*, 2005). Notably, 2021 was atypically rainy when it was supposed to be a ‘normal’ dry period (July-November) in the northern coast of Brazil. Heavy rains, in fact, continuously affected Belém during the months of August to November 2021 (INMET, 2021) with a higher freshwater influx to channels and rivers than in a typical’ dry period. This is probably due to the current global climate change scenario, which will likely significantly alter rain patterns in the Amazon region, increasing the intensity of extreme precipitation events over western Amazon as a consequence of the increasing total rainfall trends expected for this area (Alves & Marengo, 2010). Climate change has, in fact, led to significant concerns regarding conservation efforts for many marine mammals worldwide, as certain specific characteristics, such as specialized diets, restricted ranges, or reliance on specific substrates



Figure 4. The environment where the courting behavior of Amazonian manatees was observed in Mosqueiro, Belém, Pará, Brazil, a suitable habitat for sirenians. Photo by Renata Emin-Lima (Instituto Bicho D'água and GEMAM/MPEG).

or sites make many marine mammal populations particularly vulnerable to climate change (Silber *et al.*, 2017). Manatees could, thus, have benefited from this condition and gathered in the region, resulting in this mating aggregation. In such a case, female in estrus can attract reproductive males or subadults looking for a chance to reproduce (Hartman, 1979).

In practice, the opportunity to witness such an elusive event in turbid waters is rather unlikely, and suggests that Amazonian manatees are probably reoccupying Belém area and its vicinities, as well as the eastern coast of Pará state, at unprecedented rates for a large aquatic mammal. It is also important to note that the world has experienced the COVID-19 pandemic in the last two years, where the use of public areas has changed, and in some stages of the pandemic, people and vessels were not allowed in the Mosqueiro area. Although isolation rules have been reduced in the end of 2021, the use of these places has not returned to normal. No previous studies or during the SARS-CoV-2 pandemic are available to confirm that manatees may have increased their use of the region due to a reduced human presence. This event, never-before-seen and filmed near Belém, should be highlighted and may serve as baseline for future studies, to identify whether the Amazonian manatees come closer or move away from the beach area with the normal use by humans.

Continued field studies on the manatee population in this area are still lacking, especially with regard to population size, area use and behavior. This report can, thus, contribute to this goal, with the potential to be used as basis for more complex studies, including those employing information from the local community, which is especially noteworthy in view of the importance of the role Local Ecological Knowledge (LEK) – comprising knowledge, uses and practices regarding ecological relationships gained through extensive personal observation of and interaction with local ecosystems, and shared among local resource users – plays in conservation strategies (Camino *et al.*, 2020).

Finally, this remarkable observation concerning the reproductive behavior in Amazonian manatees brings hope for their long-term recovery. Community records and the *Bicho D'água* NGO efforts over the years indicate Mosqueiro as a valuable area for Amazonian manatees, while also demonstrating the need for public policies aimed at the conservation of these endangered and charismatic animals in the region.

ACKNOWLEDGMENTS

Greicy F. Ruenes kindly prepared the map. S. Siciliano is supported by INOVA/Fiocruz and CNPq

(Produtividade em Pesquisa). We are grateful to the residents and staff of the local Fire Department, who provided us with information, as well as pictures of the manatees.

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