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Distribution of Tenagodus modestus (Dall, 1881) (Mollusca, Siliquariidae) along the northern coast of Brazil: New records and biogeographical notes

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Abstract

This study presents new records of the marine gastropod *Tenagodus modestus* (Dall, 1881), a representative of the Siliquariidae family, for the northern coast of Brazil, an extensive and highly biologically productive area composed of an Amazonian Reef System. The aim of this study is to present new occurrences of the gastropod *T. modestus* on the North Coast of Brazil and to update the species' distribution along the Brazilian coast. The records were reported based on a review of scientific literature, museum databases, and an expedition carried out during the 1st Amazonian Corals Expedition conducted by the Centro Nacional de Pesquisa e Conservação da Biodiversidade Marinha do Norte - CEPNOR/ICMBio, between March 7 and 14, 2025, aboard the research vessel Soloncy Moura. In total, numerous records were made for the region, indicating that the species is present and contributes to the local biodiversity, and not an occasional occurrence. Thus, we confirm the occurrence of the species on the northern coast of Brazil and indicate an increase in its distribution along the Brazilian coast from Amapá to Espírito Santo.

INTRODUCTION

The continental shelf of northern Brazil is extensive and highly biologically productive, comprising a Amazonian Reef System, a complex consolidated bottom environment formed by living organisms (Collette and Ruetzler, 1977; Caires, 2021). The most recent records indicate 3,286 species on the Amazonian Continental Shelf, with 472 species belonging to five classes of mollusks (bivalves, gastropods, cephalopods, polyplacophorans, and scaphopods) that are generally impacted by anthropogenic actions, such as fishing practices in the region (Klautau et al., 2025).

Among marine gastropod mollusks, members of the family Siliquariidae are known worldwide as "snail worms" due to the spiral shape of their shells (Bieler, 1990; Rios, 2009). In total, three species of the genus *Tenagodus* Guettard, 1770 are known in the Western Atlantic Ocean: *Tenagodus modestus* (Dall, 1881), *Tenagodus squamatus* (Blainville, 1827), and *Tenagodus barbadensis* Bieler, 2004 (Bieler, 2004). These gastropods are rarely target species in research, with their records mainly occurring in studies of the composition of benthic fauna (Bieler, 1990). Siliquariids are reclusive creatures, living in subterranean habitats, generally associated with sponges (Bieler, 1990, 2004; Pansini, Cattaneo-Vietti, & Schiaparelli, 1999).

Bieler (2004) carried out a systematic review of the members of the genus *Tenagodus* in the Western Atlantic and provided the first detailed functional morphological study of *Tenagodus modestus* (Dall, 1881).

The gastropod has a whitish coloration, with some individuals varying in light brown tones (Dall, 1981). Its vision is limited, so it feeds on suspended detritus and has restricted mobility (stationary), which causes it to reach high densities (5,400 individuals/m^2) (Bieler, 2004). They generally occur at depths of 18 to 1,472 meters (Dall, 1881) and have recently been found in the intertidal zone (Chagas et al, 2025).

Its distribution is estimated in the Western Atlantic Ocean, from Bermuda, Florida, the Gulf of Mexico, the Caribbean Sea and the Bahamas to Brazil (Rios, 2009; Rosenberg, 2009). In Brazil, it has only confirmed records from Bahia to Espírito Santo and in the North region of Brazil, where there is an occasional report in 1975 (GBIF, 2025).

Thus, the present study aims to present new occurrences of the gastropod *Tenagodus modestus* on the northern coast of Brazil and to update the distribution of the species along the Brazilian coast.

MATERIALS AND METHODS

Study area

The collections were carried out on the northern coast of Brazil. The area is characterized by Caires et al. (2021) as the region between the mouth of the Oiapoque River, which marks the border between Brazil and French Guiana, and the mouth of the Parnaíba River, which marks the border between the states of Maranhão and Piauí, where the Amazonian and Piauí/Maranhão sedimentary basins are located, extending for more than 2,500 km. According to the same authors, this region can be divided into three sectors: (1) the coast of Amapá, with a straight coastline and a continental shelf dominated by hard, rocky substrates; (2) the coast of Pará, with a deeply indented coastline and a continental shelf dominated by predominantly muddy substrates; and (3) the coast of Maranhão, with its jagged coastline extending to Tubarão Bay, but becoming straight between Cabo Gurupi and the Parnaíba River, and the continental shelf formed by substrates with a mixture of mud and sand.

Sampling procedure

During benthos sampling, two trawl dredges were collected at 12 sampling points. Each dredge was towed for 4 minutes, at depths ranging from 75 m to 164 m. After each trawl, the sampled material was placed on the ship's deck for preliminary sorting (Fig. 1), where organisms were separated/extracted from the sediment/rocks, coded, and fixed in 70% alcohol. After landing, the samples were sent to the Biodiversity Conservation Laboratory, linked to CEPNOR/ICMBio, for taxonomic identification according to specialized literature. Subsequently, the individuals were deposited in the Malacological Collection of the Zoology Museum of UFRA, under voucher MZUFRA Moll1488.

In order to update the species' distribution limits in the region, records of its occurrence in the scientific literature on the CAPES Periodicals Portal and in databases of institutions and museums available on the Global Biodiversity Information Facility (GBIF) (https://www.gbif.org/), Ocean Biodiversity Information System (OBIS) (https://obis.org/), Taxonomic Catalog of the Fauna of Brazil (CTFB) (http://fauna.jbrj.gov.br) and on the speciesLink network (http://www.splink.org.br/) were investigated.

The search was conducted between November and December 2024, and the terms used to filter the articles were (“*Tenagodus modestus*” “*Tenagodus*” OR Siliquariidae OR “worm-snails” OR “Slit wormsnail”).

Furthermore, records of gastropod mollusks listed and reported by the CEPNOR, which conducts continuous monitoring of marine biodiversity on the Amazon Continental Shelf, were consulted.

RESULTS AND DISCUSSION

The three specimens found during the scientific expedition were associated with corals (Fig. 2A) and rhodoliths (Fig. 2B), which contradicts what was indicated by Bieler (1990), who found the species generally associated with sponges as a substrate for attachment.

The individuals found are between 60 and 80 mm long, which is consistent with previously recorded animals that generally had a total length of less than 80 mm. Even so, they are considered relatively large individuals and can reach up to 150 mm in length (Bieler, 2004; Rosenberg, 2009).

A review of the literature and databases revealed other occurrences of the species in the region. The first record, in GBIF, was in 1975; 3 records from the CEPNOR report the mollusk as bycatch in snapper fishing in 2023; and, more recently, Chagas et al. (2025) described its occurrence in 2020 in the intertidal zone, in a mangrove area located in the estuary of the Primavera River, on the Amazon coast (Fig. 3).

This study presents the species in a new area on the northern coast of Brazil, where it is found associated with coral reefs and rhodoliths (calcareous rocks). Based on these records, the presence of the species in the region is confirmed, and an increase in its biogeography along the Brazilian coast is indicated, beyond that estimated by Chagas et al. (2025) in the intertidal zone off the coast of the state of Pará.

CONCLUSIONS

Thus, the biogeographical expansion of *Tenagodus modestus* in the Northern Region of Brazil, from the state of Amapá to the coast of the state of0 Espírito Santo. This study contributes to further research on the benthic biodiversity present on the Amazonian continental shelf.

Declarations

Conflict of Interest

The authors declare no conflict of interest.

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Author Contributions

J.A.S.S. and A.C.M. wrote the main text of the manuscript. All authors (S.S.O., A.P.B.C., W.C.R.S., M.R.F.B., R.A.C. and A.G.C.M.K.) reviewed and approved the final version of the manuscript.

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Data Availability

All data generated or analysed during this study are included in this published article.

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Figures



Figure 1

Sediments collected with the aid of a dredge on the deck of the research vessel Soloncy Moura.

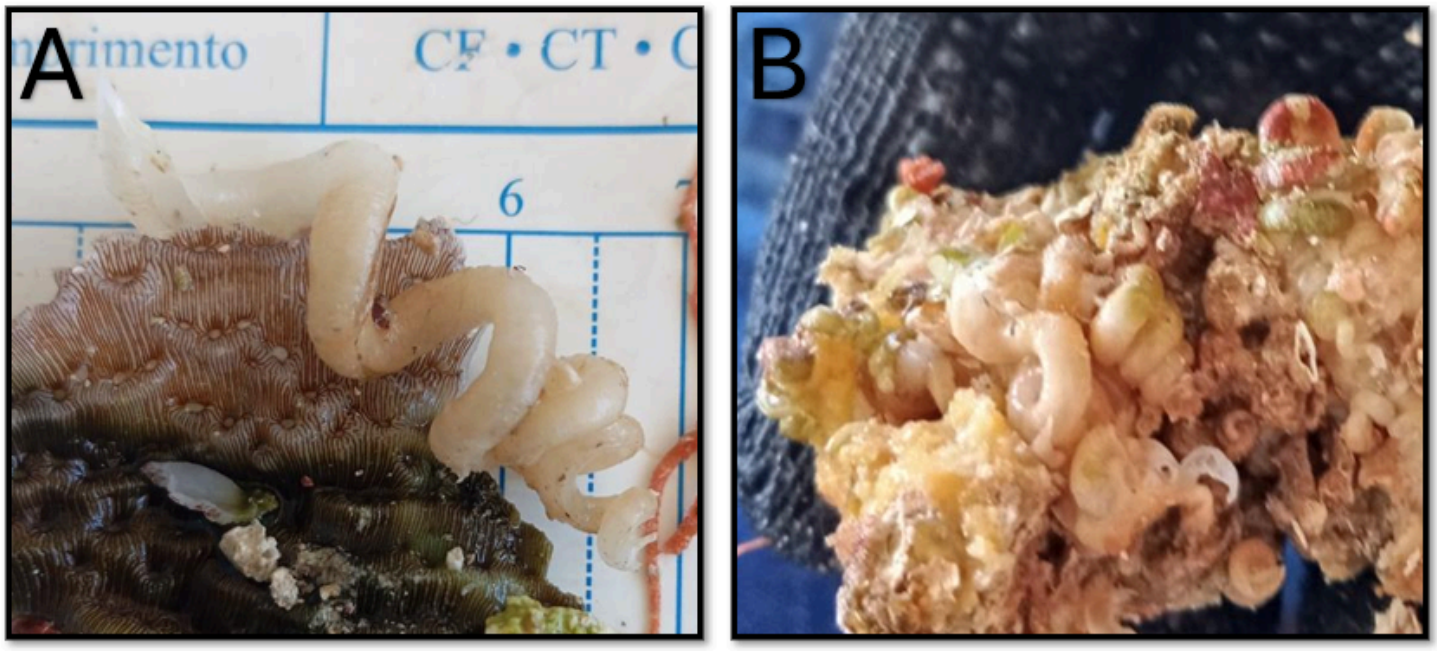


Figure 2

Tenagodus modestus associated with corals found on the Amazonian continental shelf during a CEPNOR scientific expedition. A: associated with corals. B: associated with limestone rocks.

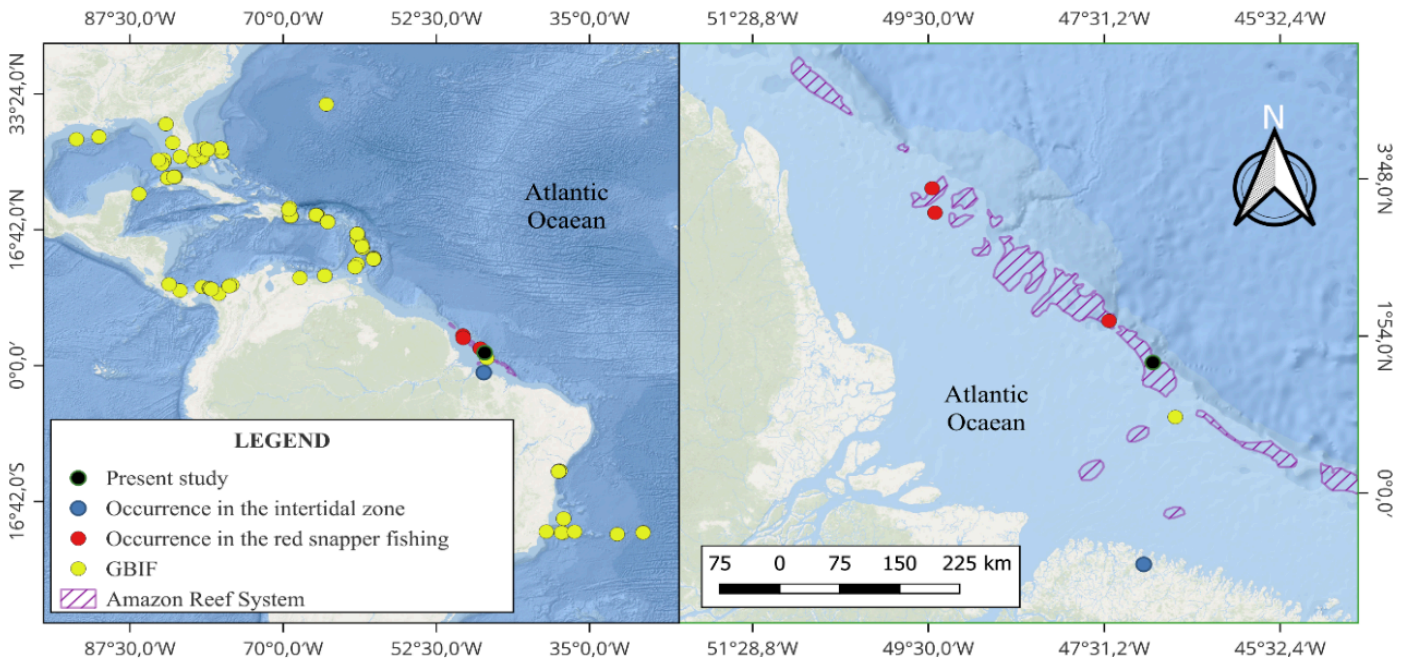


Figure 3

Map of Tenagodus modestus recording points on the Brazilian North Coast.