Type of Manuscript:
Full Article

e-ISSN: 2595-5527
Doi: 10.32435/envsmoke-2025-0003
Volume 8, 2025
Manuscript ID: es20250003
(01-06)

ENVIRONMENTAL SMOKE

NEW RECORD OF THE SWIMMING CRAB Portunus sayi (GIBBES, 1850) (DECAPODA: PORTUNIDAE) FROM THE AMAZON CONTINENTAL SHELF

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Abstract

The Amazon continental shelf (ACS) is considered to be Brazil's largest fishing ground, widely exploited by industrial fishing fleets. As a result, a high number of marine species are collected as bycatch fauna and subsequently discarded due to their lack of commercial value. In this scenario, one of the main bycatch groups is crustaceans, which are directly impacted by these actions, however, their diversity is poorly known in the northern region of Brazil. Therefore, herein, we report the northernmost observation of the swimming crab *Portunus sayi* (Gibbes, 1850) from Brazilian waters, associated with the Great Amazon Reef System (GARS). Additionally, we provide the description of the first gonopod (G1), carapace margin detail and original color. Three individuals of *P. sayi* (1 male and 2 females) were collected as bycatch of the southern red snapper fishery *Lutjanus purpureus* (Poey, 1866) using a fish trap called "manzuá", performed in areas above the GARS, at depths up to 70 m, in the continental shelf of the state of Amapá. The record of this species for northern Brazil increases the biodiversity of crustaceans in the region and indicates the ecological importance of the GARS as a diversity hotspot on the Amazon continental shelf area.

Keywords: Geographic distribution. Amazon reefs. Amazon River plume. Bycatch. Portunoidea.

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Submitted on: 07 Apr. 2025
Accepted on: 04 May 2025
Published on: 18 May 2025

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1 Introduction

The northern region of Brazil has an extensive fishing area, occurring across continental, estuarine and marine regions, with the latter taking place along the Amazon continental shelf, ranging from artisanal to industrial scales (ARAÚJO et al., 2022).

However, fishing activities may cause degradation of native biodiversity, as they change the diversity, abundance, richness and taxonomic composition of species (FULTON; SMITH; PUNT, 2005; NÓBREGA et al., 2021).

Currently, one of the most common species collected as bycatch in commercial fisheries is the members of the superfamily Portunoidea Rafinesque, 1815, which is composed of 12 families, 93 genera and 511 species, widely distributed around the world in tropical and subtropical areas (NG; GUINOT; DAVIE, 2008; WoRMS, 2025).

Species of this group occur mostly in shallow waters, covering muddy, sand, and gravel bottoms, between estuarine and shelf zones (including oceanic islands), except for some species of the genus *Bathynectes* Stimpson, 1871, family Polybiidae Paulson, 1875, which occur along the continental slope zones (MELO, 1996; MANTELATTO; ROBLES; FELDER, 2007; COELHO; ALMEIDA; BEZERRA, 2008; ALVES-JÚNIOR et al., 2017).

The genus *Portunus* Weber, 1795 globally comprises 60 species, but in Brazil it is represented only by *Portunus sayi* (Gibbes, 1850), which has been recorded in northeastern Brazilian waters, containing rare observations in the literature (MELO; VELOSO, 2005; WoRMS, 2025). Based on that, herein we report the northernmost Brazilian record (state of Amapá) of the swimming crab *P. sayi* collected as bycatch fauna in areas related to the Great Amazon Reef System (GARS).

2 Material and Methods

Study Area

Three specimens of *P. sayi* were collected as bycatch fauna during the commercial fishing operations of the red snapper *Lutjanus purpureus* (Poey, 1866), using a fish trap called "manzuá" in areas above the GARS, between the depths of 70 and 100 m, covering the areas of the Amapá continental shelf (Fig. 1).

All samples were performed under the supervision of *Centro Nacional de Pesquisa e Conservação da Biodiversidade Marinha do Norte* (CEPNOR) (SISBIO Number: 44915–3).

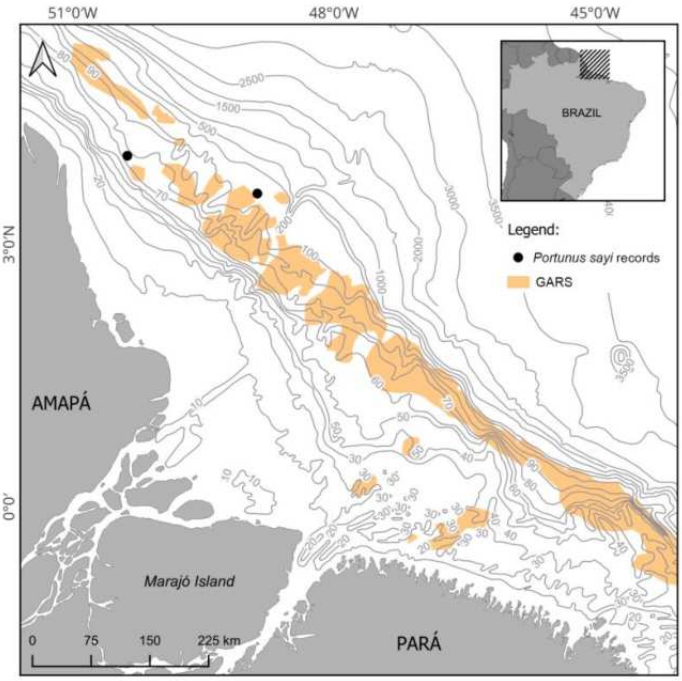

Figure 1. Map of the study area, covering the Amazon continental shelf (ACS) between the states of Amapá and Pará (Northern Brazil). Black circles = sampled points. GARS shapefile from Moura et al. (2016).

Field and laboratory procedure

After sampling, the specimens were sorted out, fixed in formaldehyde 4% and transported to Crustacean Laboratory [*Laboratório de Crustáceos* (LabCrus)] of the Federal Rural University of Amazônia [*Universidade Federal Rural da Amazônia* (UFRA)] for species identification, following Rathbun (1930), Williams (1984) and Rodrigues; Cardoso and Serejo (2017); posteriorly photographed and measured (0.05 mm) in carapace length (cl.) and carapace width (cw.). The illustrations were done using a Motic K-400 LED stereo microscope. The specimens were deposited under voucher numbers in the LabCrus Carcinological collection.

3 Results and Discussion

We observed one female (cl. 12.0, cw. 24.6) (Figure 2a) (Voucher number: 20.5.1 A), collected at the depth of 80.5 m, 04°00'46.709"N, 050°22'24.815"W, November 04th, 2022; one male (cl. 16.2, cw. 28.6) (Figure 2b,c) and one female (cl. 12.8, cw. 23.7) (Voucher number: 20.5.1B), collected at the depth of 72 m, 03°34'53.291"N, 048°52'50.154"W, May 20th, 2024. Both samples were performed on the gravel and coral/rhodolith bottoms.

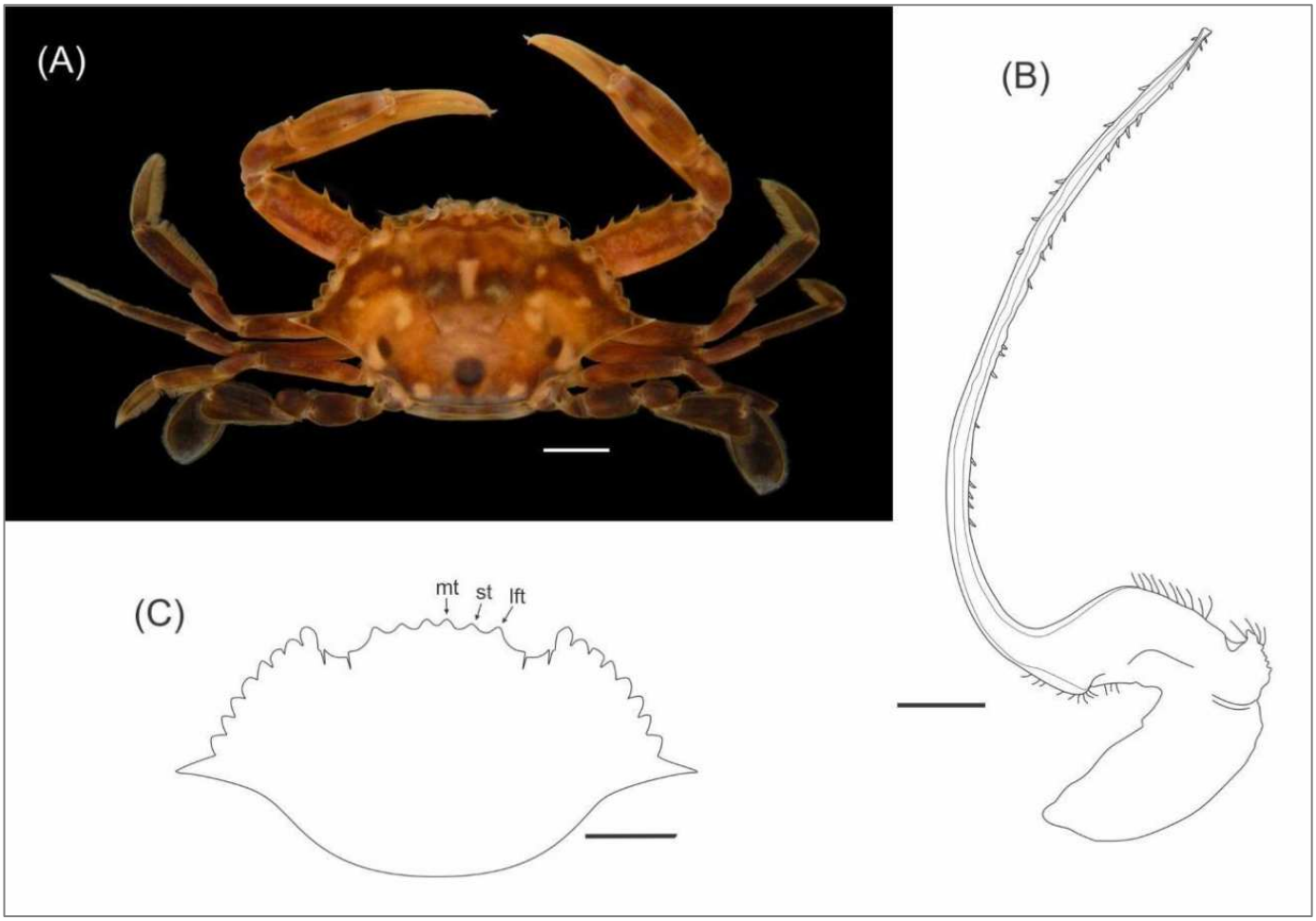

Figure 2. *Portunus sayi* (Gibbes, 1850) collected on the Amazon continental shelf (ACS) during the commercial fishing operations of the red snapper *Lutjanus purpureus* (Poey, 1866). (A) Dorsal view showing the original coloration; (B) First gonopod (G1); (C) Carapace detail. Scale bars = 5 mm (A, C), 1 mm (B). mt: median teeth; st: submedian teeth; lft: lateral frontal teeth.

According to Rodrigues; Cardoso and Serejo (2017), the main characteristic of *P. sayi* is the frontal region composed of six teeth, the median teeth being small but in similar size to submedian teeth; lateral frontal teeth are rounded and larger than the median teeth and submedian teeth (Figure 2a,c). The first gonopod (G1) is long and thin, with a slight curvature towards the inner portion; the composite setae are slightly distributed in the basal region (inner and outer); the cuspidate setae are distributed in both lateral margins from the medial region to the distal region (Figure 2b).

Our specimens (Figure 2a) showed similarity with the original coloration of *P. sayi* described by Williams (1984), as we observed whitish spots along antero-lateral margins of the carapace; the branchial and gastric regions in dark brown with white spots; dark circles in the posterior margin, one in cardiac and one in each side of branchial regions; chelipeds covering orange to light brown colours; merus of ambulatory legs 2-4 varying from light brown to dark brown, while the swimming leg is dark brown.

The geographic distribution of *P. sayi* covers coastal areas of the North Western Atlantic (Canada, United States of America, Mexico, Panama, Colombia, Venezuela, Trinidad and Tobago, Guyana), including the Caribbean Sea (Cuba, Bahamas, Jamaica, Haiti, Dominican Republic, Puerto Rico), and South Western Atlantic (Brazil, Amapá [current record, this study], Paraíba) (Figure 3) (WILLIAMS, 1984; MELO; VELOSO, 2005; RODRIGUES; CARDOSO; SEREJO, 2017; GBIF, 2025).

Additionally, Melo and Veloso (2005) indicated the presence of this species in the state of Bahia, however, their study was carried out in the state of Paraíba, without sample stations in other northeastern states, creating dubious information about the distributional range of *P. sayi*. The species *P. sayi* is observed along the water column (pelagic areas), associated with cold waters of the Western Atlantic, as observed in the Labrador Current areas, covering the northeastern coast of Canada and USA (WILLIAMS, 1984; COELHO; ALMEIDA; BEZERRA, 2008).

However, the presence of *P. sayi* in tropical waters, including coastal zones may be related to three factors, the first is associated with cold bottom currents, where the process of resurgence relocates this species to shallow water environments. The second is that *P. sayi* is usually found living among floating *Sargassum* spp., thus reaching new distributional areas (RATHBUN, 1930; WILLIAMS, 1984); this case has been observed in blooms/occurrence of invasive holopelagic algae in areas of the Amazon continental shelf (ACS), which is actively involved in the transportation of marine species and litter between different areas of the Atlantic (Eastern to Western regions) (ALVES-JÚNIOR et al., 2024a).

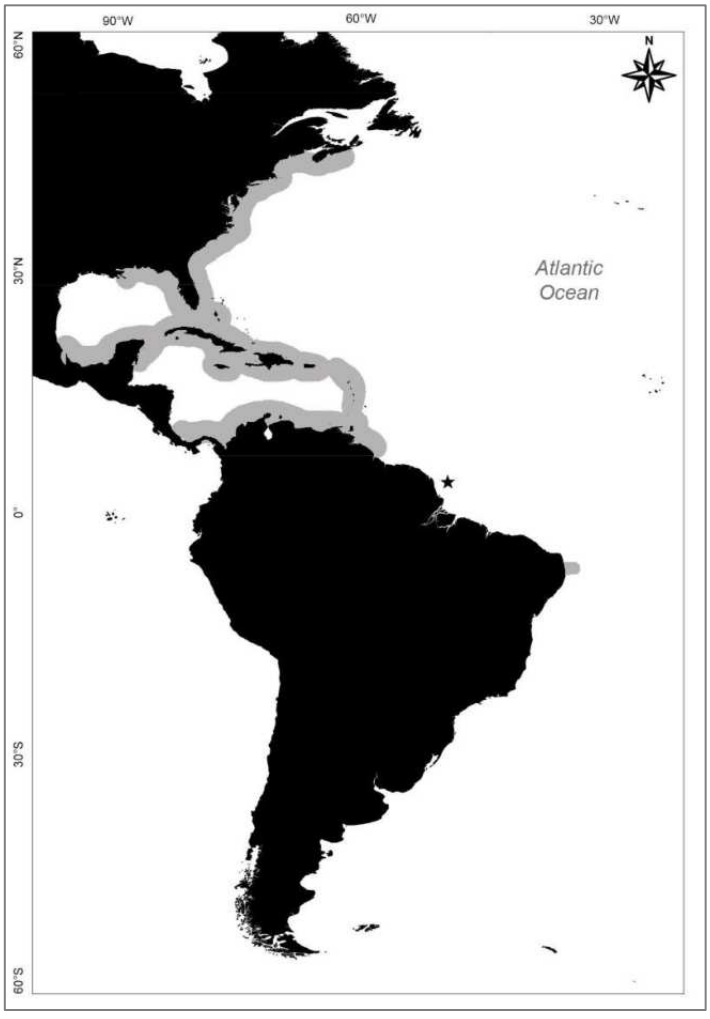

Figure 3. Geographical distribution of *Portunus sayi* (Gibbes, 1850). Caption: Previous records from literature colored in gray (according to WILLIAMS, 1984; MELO; VELOSO, 2005; RODRIGUES; CARDOSO; SEREJO, 2017 and GBIF, 2025), current record (★).

Besides that, the last factor for the presence of this species on the Amazon continental shelf may be associated with the GARS, where the mesophotic reefs (below 70 m depth), composed of rhodolith beds, with muddy, sandy, gravel and carbonate bottoms, become an ideal habitat for catching prey, in addition to a large contribution of organic matter from the Amazon River plume, forming a region with distinct geo-habitats and high energy flow (MOURA et al., 2016).

Some hypotheses indicate that the GARS may be a disperser of species below the Amazon River plume, acting as a macro-habitat connecting species from the Caribbean and South America, which may explain the species wide distribution throughout the Western Atlantic (ALVES-JÚNIOR et al., 2024b).

The northern region of Brazil, between the states of Amapá and Pará, is considered one of the most extensive fishing areas (exploiting red snapper fish, shrimps and lobsters), especially in continental shelf region between 30 and 100 m depth (CINTRA et al., 2020; PINHEIRO et al., 2024); however, this activity has a strong impact on native biodiversity, especially through bycatch.

Despite the low abundance of this species in our samples, the fishing activities on the Amazon continental shelf region may be impacting on the biology of the species, making further studies necessary to assess the real damage to crustacean populations which are widely collected and discarded as bycatch fauna.

4 Conclusions

In conclusion, herein we report the second observation of *P. sayi* for the Brazilian coast, providing additional morphological information about the first gonopod. Additionally, this study reinforces the need for further studies aiming to access the crustacean biodiversity occurring in the region of the GARS.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Conceptualization: D.E.G.M., I.H.A.C. and F.A.A.J. Research, development and writing: D.E.G.M., I.H.A.C. and F.A.A.J. Sample Analysis: D.E.G.M. and F.A.A.J. Map development: D.E.G.M. Review: D.E.G.M., I.H.A.C. and F.A.A.J. Review and correction: D.E.G.M., I.H.A.C. and F.A.A.J. Translation to English: D.E.G.M.

DECLARATION OF INTEREST

The authors disclose that they have no known competing financial interests or personal relationships that could have appeared to influence the study reported in this manuscript.

FUNDING SOURCE

The authors declare that no funding is applicable for this research.

ETHICAL PROCEDURES

No procedures involving live animals were performed in this study. All specimens were retrieved from Brazilian regulated commercial fishing operations and were dead (fixed) upon examination.

ACKNOWLEDGEMENTS

The authors would like to thank the *Centro Nacional de Pesquisa e Conservação da Biodiversidade Marinha do Norte* (CEPNOR) for the collection of the examined material and support in the laboratory. Additionally, the authors would like to thank the anonymous reviewers for their precious comments on this paper.

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