



Becoming a mother too early: The first record of the smallest ovigerous female of the deep-sea squat lobster *Iridonida iris* (A. Milne Edwards, 1880) (Decapoda: Munididae)

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Abstract: We report the smallest ovigerous female of *Iridonida iris* (A. Milne Edwards, 1880) in the literature, collected in the Great Amazon Reef System (GARS). This finding raises some questions about the presence of deep-sea species associated with the GARS, which may be acting as a breeding and migration environment for both coastal and continental slope species.

Key words: Great Amazon reef system, Amazon province, Benthic habitat.

Tornando-se uma mãe muito cedo: O primeiro registro da menor fêmea ovígera de lagostim de mar profundo *Iridonida iris* (A. Milne Edwards, 1880) (Decapoda: Munididae). **Resumo:** Reportamos a menor fêmea ovígera de *Iridonida iris* (A. Milne Edwards, 1880) registrada para a literatura, coletada no Grande Sistema de Recifes Amazônicos (GSRA). Este achado levanta alguns questionamentos sobre a presença de espécies profundas associadas ao GSRA, o qual pode estar atuando como um ambiente de reprodução e migração para espécies tanto costeiras quanto oriundas do talude continental.

Palavras-Chaves: Grande sistema de recifes Amazônicos, Província Amazônica, Habitat bentônico.

The squat lobsters of the family Munididae Ahyong, Baba, Macpherson & Poore, 2010 are widely reported around the world in benthic habitats from the continental shelf to deep waters of the abyssal plains (Melo-Filho & Melo 2001, Cardoso *et al.* 2021). Among 39 genera occurring into this family, the genus *Iridonida* Macpherson & Baba, 2022 (previously called *Munida* Leach, 1821) contains 16 species, of which only seven have been

reported from Brazil: *Iridonida angulata* (Benedict, 1902); *I. heblingi* (Melo-Filho & Melo, 1994); *I. iris* (A. Milne Edwards, 1880); *I. irrasa* (A. Milne Edwards, 1880); *I. petronioi* (Melo-Filho & Melo, 1994); *I. pusilla* (Benedict, 1902) and *I. spinifrons* (Henderson, 1885).

Studies about Munididae are concentrated in taxonomic and distributional patterns, leaving most of their reproductive aspects still unknown to

science. Few studies in the literature report biological and reproductive aspects of squat lobsters such as Van Dover & Williams (1991), Palma & Arana (1997), Tapella *et al.* (2002), Hernandez & Wehrtmann (2011; 2014), Kilgour & Shirley (2014) and Hernandez (2018). Into the irodonid species occurring in Brazil, *I. iris* is widely reported from Amapa, Para, Alagoas, Bahia, Sao Paulo, Santa Catarina and Rio Grande do Sul, covering the depths of 45 to 1.303 m (Melo-Filho & Melo 2001, Silva *et al.* 2020, Cardoso *et al.* 2021). However, data on growth, fecundity and reproduction are non-existent for these species. Based on that, in this paper, we report the smallest ovigerous female in literature for *Iridonida iris* (A. Milne Edwards, 1880), collected from Brazilian waters.

The specimen of *I. iris* was collected as bycatch fauna during commercial fishing operations of the red snapper (*Lutjanus purpureus*; Poey, 1866), performed above the Great Amazon Reef System (GARS), between the depths of 70 and 100 m, in the state of Para (coordinates 026' 14.4"N; 04729'6"W) (Fig. 1), using an iron cage trap called "manzua" (5 cm of mesh), in August 2022, with the

samples under the supervision of National Center for Research and Conservation of Northern Marine Biodiversity (CEPNOR) (SISBIO Number: 44915–3). The rhodoliths adhered in the external area of the trap were removed manually, fixed in formalin 4% and transported to the laboratory to remove the associated fauna. The tiny squat lobster was removed from inside the rhodolith cavities, identified, photographed, measured in total length (tl.), carapace length (cl.) and wet weight (ww in grams), and the eggs were counted. The specimen was deposited in the Carcinological Collection (Labcrus) of the Federal Rural University of the Amazon (UFRA), under the voucher number: 40.1.1 O.

It was captured only one ovigerous female of *I. iris* (Fig. 2 a,b) (tl: 6.7 mm; cl: 4.3 mm, ww: 0.07 g and 73 eggs), at depths of ~90 m, in gravel bottoms, containing corals and rhodolith beds. Only one previous study addressing reproductive traits of Munididae species for Brazil was carried out by Hernandez (2018), which reported tiny ovigerous females of *I. pusilla* [= *Munida pusilla*] between 3.4 and 4.6 mm of carapace length, showing similar

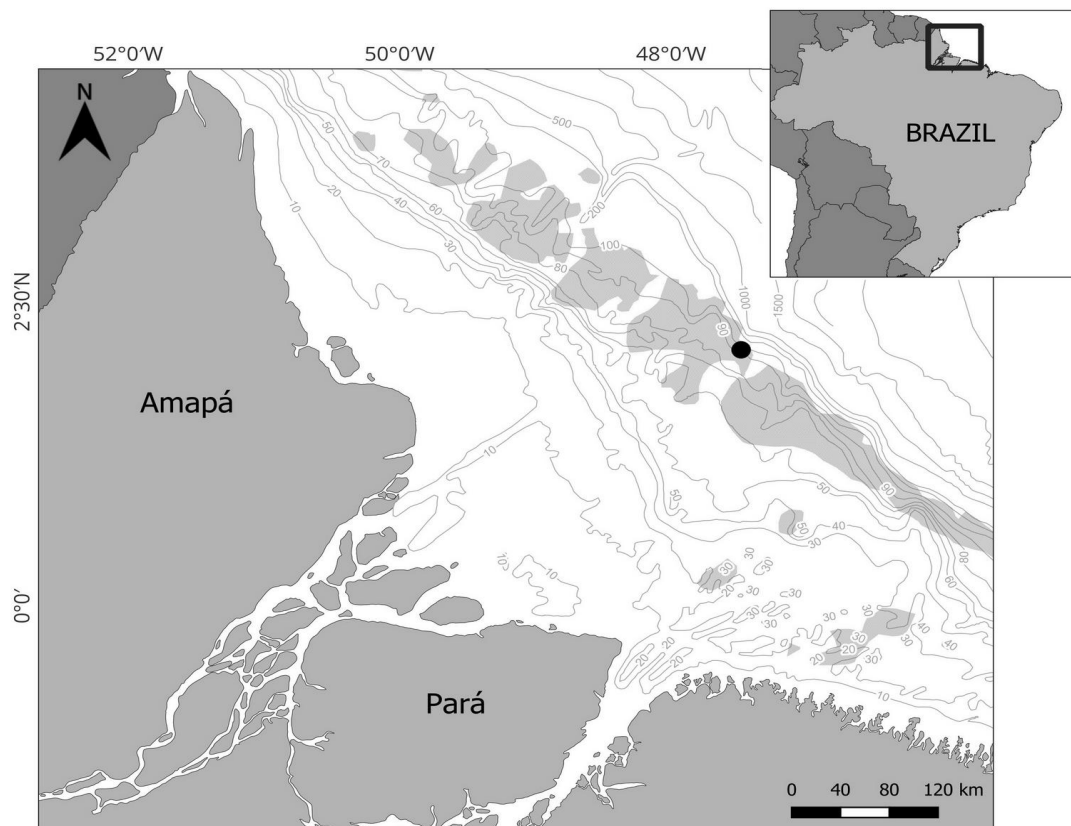


Figure 1. Map showing the sample site (black circle) in Great Amazon Reef System (GARS) (in gray), where the squat lobster *Iridonida iris* (A. Milne Edwards, 1880) was collected inside the rhodoliths at the depth ~ 90 m.

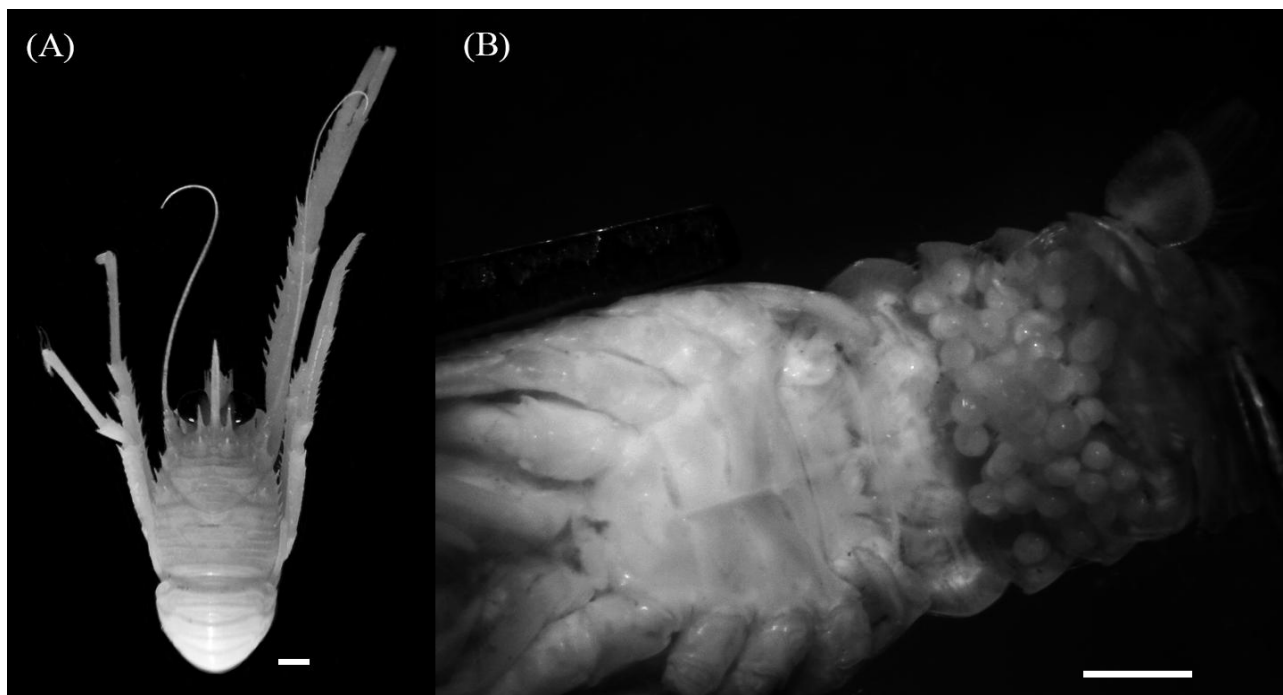


Figure 2. (A) *Iridonida iris* (A. Milne Edwards, 1880) in dorsal view. (B) Ventral view of *I. iris* showing the egg mass in abdominal somites. Scale bar = 1 mm.

results to the observed in this study for *I. iris*. In studies provided by Melo-Filho & Melo (2001), with specimens of *I. iris* collected in the continental slope of southeast and south regions of Brazil, they observed the carapace length between 14.8 and 18.6 mm, with males reaching larger sizes than females. According to Hernandez (2018), the egg production is widely variable within Munididae, with species showing high egg numbers as *Babamunida forceps* (A. Milne Edwards, 1880) [= *Munida forceps*], between 80 and 3060 eggs; *Antillimunida flinti* (Benedict, 1902) [= *Munida flinti*] presents the egg number between 82 and 2440 and *Garymunida longipes* (A. Milne Edwards, 1880) [= *Agononida longipes*] showing between 137 and 2078 eggs. Meanwhile, in the same study, small species of the squat lobsters such as *Munidopsis spinifrons* Dong, Xu, Li & Wang, 2019 and *M. erinacea* (A. Milne-Edwards, 1880) have a reduction in the size and in egg number, with both species showing from 53 to 97 and 8 to 12 eggs, respectively.

The presence of *I. iris* in shallow waters of continental areas was previously reported in literature; however, the occurrence in coral reefs is unusual. The observation of the species analyzed in this study in coral and rhodolith banks may be associated with the presence of mesophotic reefs, which extends from the French Guiana to the State of Maranhao - Brazil, covering closely 1.000 km in length and depths of 30 to 120 m (Moura *et al.*

2016). The GARS can be classified as a diversity hotspot in Amazon River mouth region, acting as a migratory path for demersal and benthic species, between South America and the Caribbean Sea. Additionally, it may be a breeding site from coastal and deep species, due to the high energetic flow, abundance of the organic matter and the heterogeneity of habitats. These factors favor the occurrence of *I. iris* seeking for protection during the egg incubation; thus, it may indicate a migration to shallow waters during reproductive periods. In conclusion, we registered the smallest ovigerous female of *I. iris* reported in literature, it reinforces the need for more studies on the reefs, so that we can understand the real biodiversity and functionality of the GARS.

Acknowledgments

The authors would like to thank the National Center for Research and Conservation of Northern Marine Biodiversity (CEPNOR) for the sampled material. The authors would like to thank the anonymous reviewers for their corrections throughout the manuscript.

Ethical Statement

The present investigation did not involve regulated animals and did not require approval by an Ethical Committee.

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Received: December 2023

Accepted: March 2024

Published: August 2024