



NEW RECORD OF THE SPIDER CRAB *Mithrax tortugae* RATHBUN, 1920 IN THE NORTHEAST OF BRAZIL, FIRST RECORD ON THE COAST OF RIO GRANDE DO NORTE

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Abstract: The Northeast region of Brazil has gaps in the distribution of several species of crustaceans. In the last decade, the increase in the sampling effort and the elaboration of species lists have minimized this problem. In some cases, studies suggest that these “gaps” in the distribution of some organisms may be a natural part of a discontinuity in their geographical limits. During the lobster fishing expeditions on coral reefs in the north coast of Rio Grande do Norte (RN), for the first time, the spider crab *Mithrax tortugae* was captured in RN. After capture, some specimens were sent to the UFRN aquatic fauna laboratory for identification and biometrics. After confirmation of identification, they were deposited in the UFRN invertebrate collection. Thus, the present work aims to update the distribution area of the species, and to fill an existing gap for the Northeast region, bringing the first record of *Mithrax tortugae* on the coast of Rio Grande do Norte.

Keywords: Coral reefs; Decapoda; Geographic distribution; Mithracidae.

The family Mithracidae MacLeay, 1838, represented by the “spider crabs”, are known by the piriform carapace, with three or four closest spines (Rathbun 1925). It has a wide distribution in marine environments all over the world (Hendrickx 1999), commonly found in coral reefs, and seaweed banks, in depths ranging from 5 to

450 meters (Melo 1996, Baeza *et al.* 2010, Windsor & Felder 2014). In addition to their wide distribution, Mithracidae have great species richness and the last decade has been the focus of studies on ecological limits and distribution patterns (Alves *et al.* 2012).

Among the representatives of the Mithracidae

is *Mithrax tortugae* Rathbun, 1920, a species that inhabits coral reefs at depths between 5 and 45 meters (Melo 1996). The species distributed throughout North, Central and South America, occurring in the United States of America, Mexico, Belize, Honduras, Caribbean and Brazil (Melo 1996, Alves *et al.* 2012). On the Brazilian coast, *Mithrax tortugae* was registered in the states of Pernambuco, Alagoas, Bahia, Espírito Santo, Rio de Janeiro, São Paulo and Santa Catarina, encompassing the ecogeographic provinces: Tropical Southwestern Atlantic and Warm Temperate Southwestern Atlantic (*sensu* Spalding *et al.* 2007).

In Brazil, the North and Northeast regions

have gaps in occurrence for several species of crustaceans. Among the states of the Northeast region, Rio Grande do Norte (RN) is one of the few that still does not have an official inventory of its carcinofauna. The recent increase in records of new occurrences of Decapoda in RN reinforces the hypothesis that the knowledge of the local carcinofauna is still incipient and distant from the real diversity. The present study lists the new record of *Mithrax tortugae* on the coast of Rio Grande do Norte, the most northerly record at Southeast Atlantic and at the Northeast of Brazil.

The material examined was collected at Porto do Mangue beach (4°57'14.42" N; 36°29'40.36" W) (Figure 1), north coast of Rio Grande do Norte

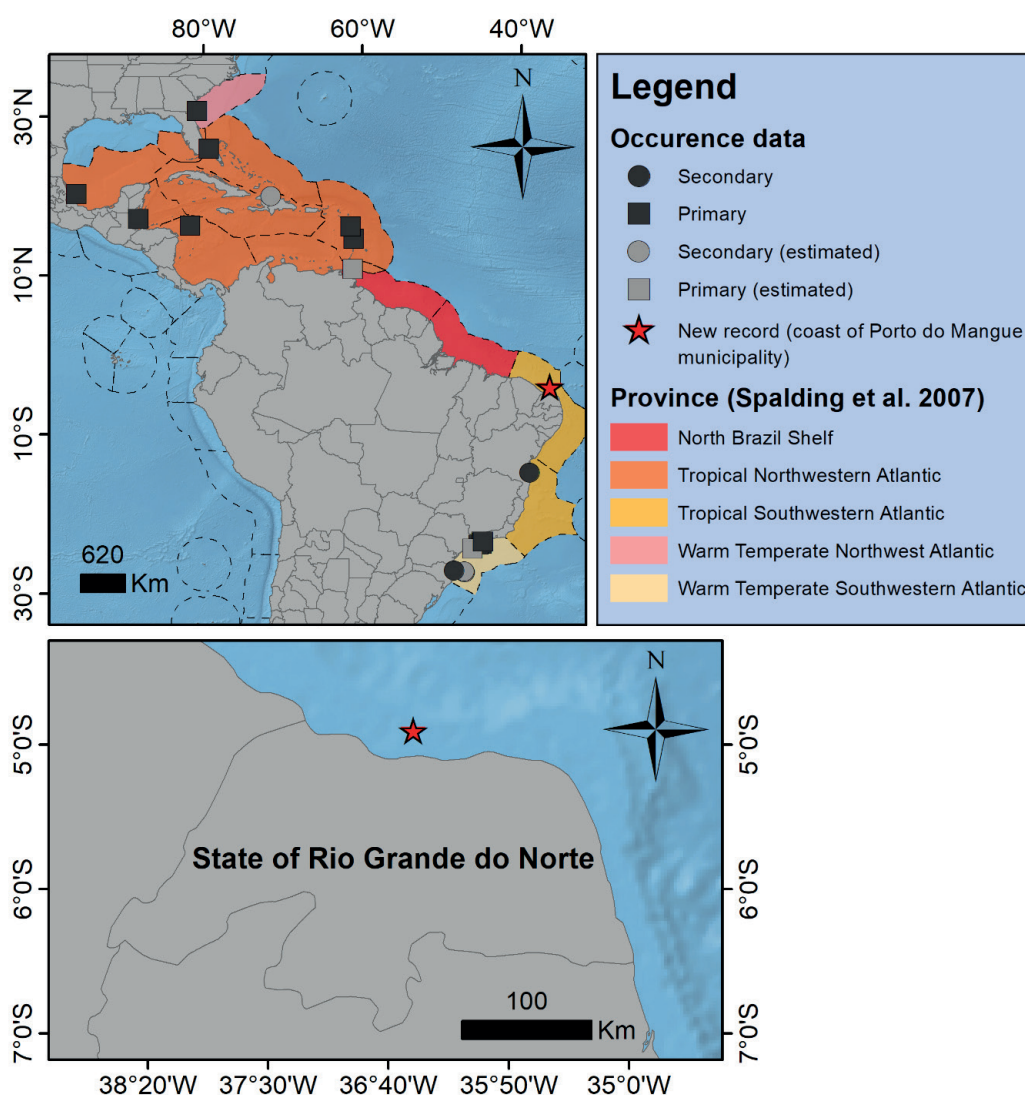


Figure 1. Distribution of the spider-crab *Mithrax tortugae* Rathbun, 1920 for primary occurrence data (first new record on the Rio Grande do Norte coast, Porto do Mangue municipality) and secondary data (*sensu* Global Biodiversity Information Facility and literature). Data without available geographic coordinates were estimated according to the description of the site. Additionally, the provinces of the marine ecoregions were represented according to Spalding *et al.* (2007).

in March 2015 through local lobster fishing. The traps were wrapped in steel mesh (height: 1.30 m, length: 1.30 m), used locally as a trap for catching lobster (*Panulirus spp.*). Local fisheries rely on an artisanal fishing boat for transport to pre-determined locality. In these areas, the traps are anchored to the substrate. After two days of anchoring, all the traps are collected and taken to the coast, where the animals are withdrawn.

The specimens were taken to the Universidade Federal do Rio Grande do Norte (UFRN) at Laboratório de Fauna Aquática for identification according to Melo (1996). After this identification, the examined material was taken to Museu de Oceanografia da Universidade Federal de Pernambuco (MOUFPE) for comparison with specimens of *M. hispidus* for exclusion since *M. tortugae* specimens were absent in this zoological collection. We measured the carapace width (CW) of the examined material with a digital caliper (precision: 0.1 mm) and the animals were sexed according the presence of gonopods or gonopores. After the analysis, all animals fixed in 70 % ethanol solution and deposited in the collection of invertebrates of the UFRN (Grupo de Estudos de Ecologia e Fisiologia de Animais Aquáticos – GEEFAA, 1010–1013).

To analysis of the distribution, Global Biodiversity Information Facility (GBIF) data [<http://www.gbif.org/>] - primary data - and systematic literature review data (Fransozo *et al.* 1992, Melo 1996, Rhyne *et al.* 2006, Almeida & Coelho 2008, Windsor *et al.* 2009, Baeza *et al.* 2010, Alves *et al.* 2012, Windsor *et al.* 2014, Klompmaker *et al.* 2015, Magalhães *et al.* 2017, Windsor *et al.* 2017) - secondary data - were compiled, information of geographic coordinates when absent were estimated through other site record information. In the Quantum GIS 2.18 Software (QGIS Development Team, 2016) using the WGS 1984 coordinate system, georeferenced vectors were extracted from the databases of the Instituto Nacional de Pesquisas Espaciais (INPE, <http://www.inpe.br>) and bioregionalizations by Spalding *et al.* (2007).

The examined material consisted of four individuals, 1 ovigerous female (CW 19.2 mm), GEEFAA – UFRN 1010; 1 male (CW 14.0 mm), GEEFAA – UFRN 1011; 1 female (CW 13.5 mm), GEEFAA – UFRN 1012 and 1 female (CW 16.9 mm),

GEEFAA – UFRN 1013. The comparative material was 1 individual of *Mithrax hispidus*, male, from Beach of Janga (PE). (MOUFPE–6145); determiner: JFS Filho.

Diagnosis of *Mithrax tortugae* was: Carapace wider than long (Figure 2a). Cardiac and gastric regions with a well-marked margin, the anterior margin being twice the width of the posterior margin. Anterior region with 5 tubers aligned transversely. Meso-branchial region with 3 tubers. Anterolateral margin with 4 lobes, sometimes acuminate, except for the external orbital. Last anterolateral spine directed forward (Figure 2b). Short rostral processes separated by sinus and “V” shape (Figure 2c). Circular orbits and with 2 tiny tubers on the upper margin. Inner margin of the ischiopodite of the third spinous and hairy maxillipede (Figure 2d). Chelipods with tubers on the dorsal surface and with 2 tubers on the inner surface (adapted from Melo 1996).

The examined material comprises the first occurrence of *M. tortugae* in the coast of Rio Grande do Norte, extending the geographic distribution of this species along the Brazilian coast. Since the absence of *M. tortugae* material on MOUFPE collection, we used *M. hispidus* for identification by exclusion, besides the photos herein to confirm its identification. Current information regarding the geographic occurrence of decapod crustacean species indicates a discontinuous distribution along the Brazilian coast. Sometimes, influenced by physical-chemical barriers such as the Amazon river plume in the northern region (Silva *et al.* 2005, Lalor *et al.* 2006, Nicolodi *et al.* 2009), sea currents in the southeast region (Pantaleão *et al.* 2016, De Souza *et al.* 2018, Bernardes *et al.* 2019, Teixeira *et al.* 2019) or discontinuity of habitat (Pantaleão *et al.* 2016).

The spider crab *Mithrax tortugae* reveals a congruence between its limits of geographical distribution and the formation of corals that emerge in the Caribbean Sea region. This formation extends in a discontinuous way along the coast of Brazil coast, similar to the distribution of several species of invertebrates (Vallejo 1996, Iglesias *et al.* 1999, Lemaitre *et al.* 1992). Based on known occurrences, it is assumed that the presence of coral formation could be a relevant factor for the presence of *Mithrax tortugae*, creating favorable conditions for survival and providing resources

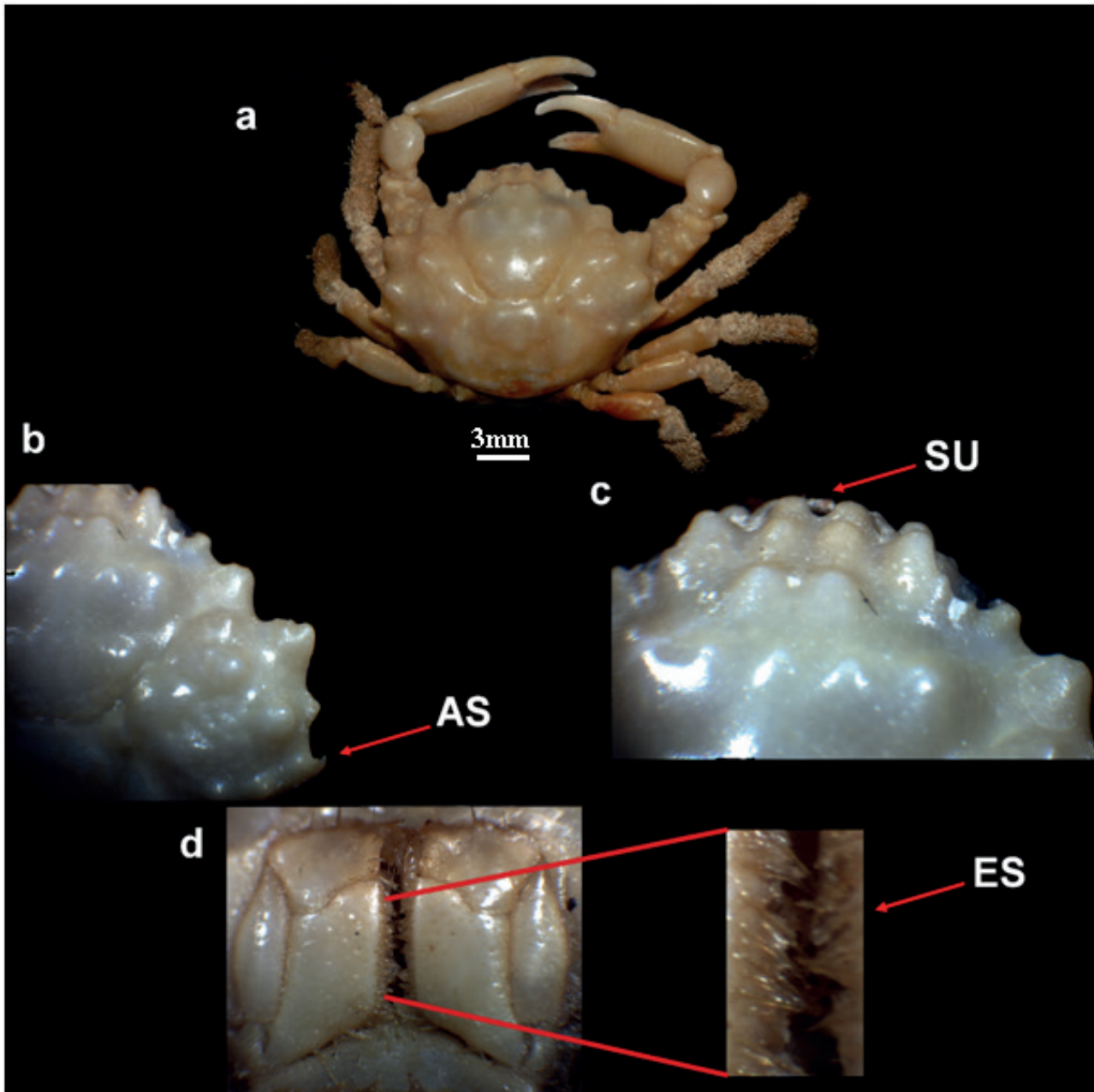


Figure 2. Order: Decapoda Latreille, 1802. Family: Mithracidae Macleay, 1838. Genus: *Mithrax* Latreille, 1816. a) *Mithrax tortugae* male (voucher:UFRN 1011). Representation of diagnosis structures of *M. tortugae*: b) (AS) - Anterolateral spine. c) (SU) - Sinus and “V” shape. d) (ES) - ischiopodite of the third spinous and hairy maxillipede.

such as places for shelter and reproduction. Although in the last decade, representatives of the family Mithracidae, including *M. tortugae*, have been the target of a greater number of studies, mostly of a taxonomic nature (Rhyne *et al.* 2006, Windsor *et al.* 2009, Klompaker *et al.* 2015, Magalhães *et al.* 2017), ecological investigations that address the correlation between coral formation and the geographical limits of family representatives are still scarce in the literature. Therefore, until the present moment, there

are only speculations on the similarity in the discontinuity of the distribution of several species that inhabit coral formations. In this way, the present study is yet another contribution to increase the known occurrence of the species and the family Mithracidae on the coast of Brazil, contributing to the knowledge of carcinofauna in the Northeast region, especially in the state of Rio Grande do Norte.

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