

Extension of geographical range and first record of *Trizocarcinus* Rathbun, 1914 (Brachyura: Euryplacidae) from the Western Tropical South Atlantic

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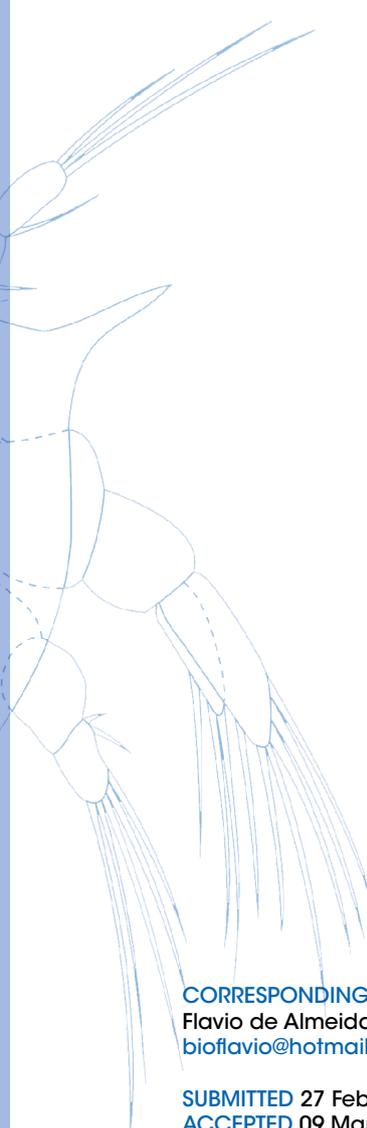
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ABSTRACT

Here, we report the first occurrence of *Trizocarcinus* Rathbun, 1914 (Brachyura: Euryplacidae) from the South Atlantic (Brazil). *Trizocarcinus tacitus* Chace, 1940 was collected in the upper continental slope of the Potiguar Basin, northeastern Brazil. The new record expands by 3000 km the southern distribution of the species in the Western Atlantic.

KEYWORDS

Brazil, continental slope, deep-sea fauna, Goneplacoidea, Potiguar Basin.



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INTRODUCTION

The family Euryplacidae Stimpson, 1871 is composed of marine crabs and its taxonomy was most recently revised by Castro and Ng (2010). The family currently comprises 15 genera found globally with a total of 32 recognized species (Castro and Ng, 2010; Ng *et al.*, 2019). Members of this family occur on mud or gravel substrates between the continental shelf and the continental slope in depths from intertidal to 552 m (Castro and Ng, 2010).

Although the family has a widespread distribution in the Indo-West Pacific, Tropical and Eastern Pacific, and Western and Eastern Atlantic regions, only six species are known from the Western Atlantic (Castro and Ng, 2010), including members of the genus *Trizocarcinus* Rathbun, 1914, which is endemic to the Americas (Atlantic and Pacific Oceans), comprising only two species *Trizocarcinus dentatus* (Rathbun, 1893) and *T. tacitus* Chace, 1940. *Trizocarcinus dentatus* is endemic to the tropical Eastern Pacific, occurring at depths between 36–126 m, whereas *T. tacitus* is known from the Gulf of Mexico and Caribbean Sea in the Western Atlantic, in depths between 187–462 m (Chace, 1940; Castro and Ng, 2010). We report the first occurrence of *Trizocarcinus* from the South Atlantic (Brazilian Waters), based on specimens of *T. tacitus* collected in the upper continental slope of the Potiguar Basin, northeast Brazil.

MATERIAL AND METHODS

The specimens of *Trizocarcinus tacitus* were collected in the Northeast region of Brazil, between the states of Ceará (CE) and Rio Grande do Norte (RN) (Potiguar Basin) during the research project entitled “Avaliação da biota bentônica e planctônica da Bacia Potiguar e Ceará (Bpot)”, developed by the Brazilian Oil Company “Petróleo Brasileiro S/A (Petrobras)” onboard the R/V *Seward Johnson*. The material was collected in May 2011 from bottom trawls conducted on the continental slope using a semi-balloon otter trawl with 50 mm mesh size and 18 m of mouth opening for 30 minutes between the

depths of 150–2068 m. Water temperature and salinity were recorded.

The material was sorted and preserved in 70% ethyl alcohol and thereafter identified following Chace (1940) and Castro and Ng (2010). The specimens were measured with a digital caliper (0.01 mm) for carapace length (cl) and carapace width (cw). The material is deposited in the crustacean collection of the “Museu de Oceanografia Prof. Petrônio Alves Coelho (MOUFPE)” at Federal University of Pernambuco, Recife, Brazil.

SYSTEMATICS

Family Euryplacidae Stimpson, 1871

Genus *Trizocarcinus* Rathbun, 1914

Trizocarcinus tacitus Chace, 1940

(Figs. 1 – 3)

Goneplax tridentata — Boone, 1927: 10, figs. 2–4 [Belize]; 1930: 194, pl. 66, fig. A [Florida] [not *Trapezioplax tridentata* (A. Milne-Edwards, 1880); Pseudorhombilidae].

Trizocarcinus tacitus Chace, 1940: 41, figs. 15, 16. — Chace, 1956: 20 [Gulf of Mexico]. — Guinot, 1969: 518, 522 [discussion], figs. 34, 43, 45, 50, 51 [holotype]. — Guinot, 1971: 1081 [in list]. — Soto, 1985: 484, 495. — Soto, 1986: 3, 4, 36. — Soto, 1991: 626, 627. — McLaughlin *et al.*, 2005: 257 [in list]. — Ng *et al.* 2008: 78 [in list]. — Castro and Ng, 2010: 110, figs. 45A–B, 46 G–M.

Material examined. 4 males (cl: 1.8–3.3 cm, cw: 2.1–3.5 cm), station - MT#63, 04°36.2400'S 036°45.7395'W, 416 m, temperature 7.47 °C, salinity 34.6, date: 05 Aug 2011, MOUFPE 18877.

Distribution. Western Atlantic: United States (Florida, Dry Tortugas, St. Vincent), Bahamas, Gulf of Mexico, West Indies, Guadalupe, Barbados, Brazil: Rio Grande do Norte (Potiguar Basin) (Fig. 3), 187–462 m depth (new record) (Chace, 1940; Castro and Ng, 2010; herein).

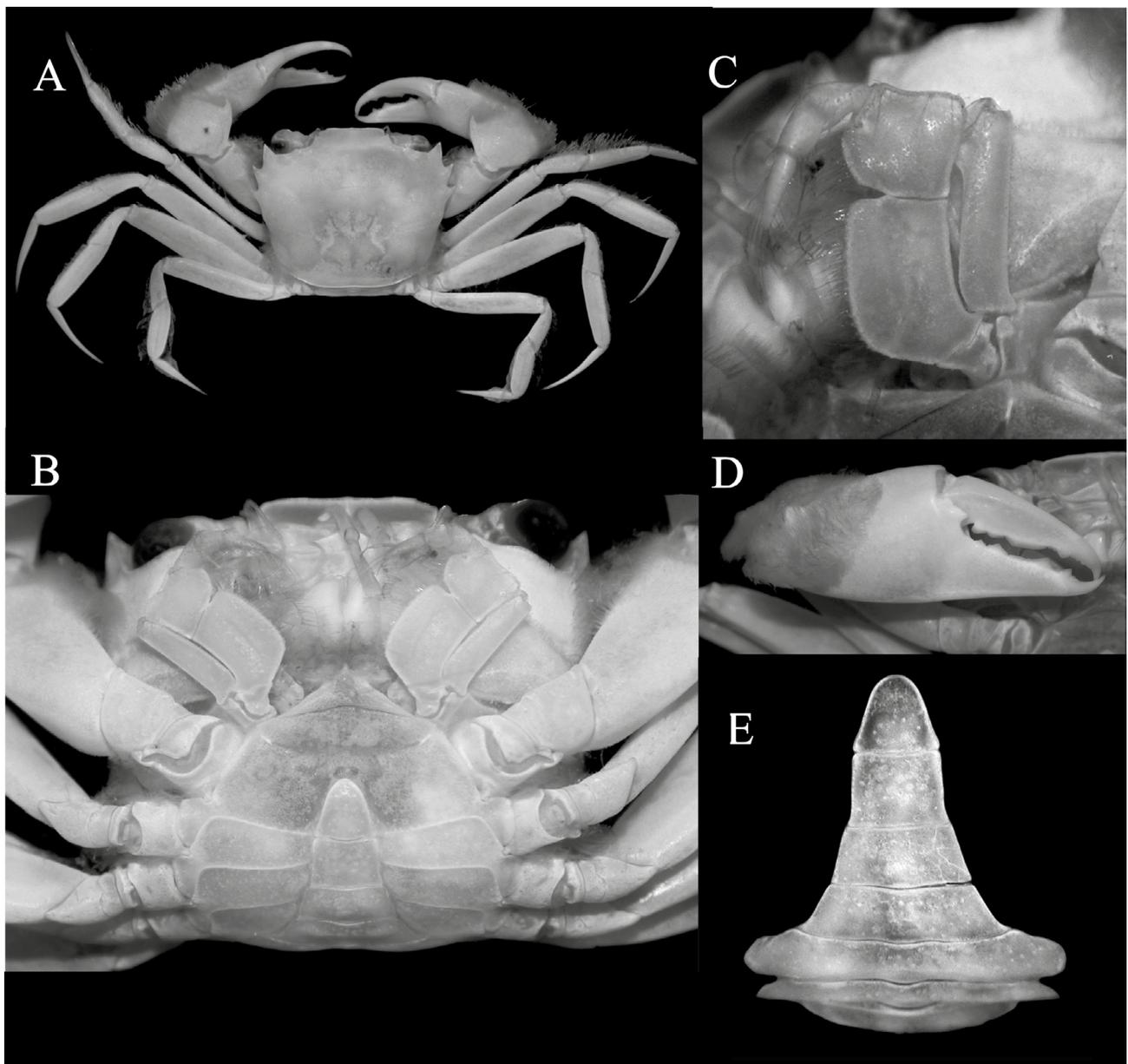


Figure 1. *Trizocarcinus tacitus* Chace, 1940, male (cl: 1.8 cm, cw: 2.1 cm), Potiguar Basin, station MT#63, 416 m, Rio Grande do Norte, northeastern Brazil (MOUFPE 18877). **A**, Dorsal habitus; **B**, ventral view; **C**, right third maxillipeds in ventral view; **D**, right cheliped; **E**, pleon with somites 1–6 and telson.

Remarks. The present specimens of *T. tacitus* agree very well with the original description provided by Chace (1940) and subsequently revised by Castro and Ng (2010); their specimens from the Gulf of Mexico and Caribbean Sea. *Trizocarcinus tacitus* can easily be distinguished from its congener *T. dentatus*, which is from Tropical Eastern Pacific, by the following characteristics (in parentheses for *T. dentatus*): carapace with dorsal and ventral margin smooth (**Fig. 1A**) (vs. granular); outer orbital tooth conspicuous and well developed (**Fig. 1A**) (vs. outer orbital tooth

reduced); stridulating ridge absent on pterygostomial region (**Fig. 1B, C**) (vs. granular stridulating ridge on pterygostomial region); ambulatory propodus and dactylus with anterior margin densely setose (**Fig. 1D**) (vs. structure densely setose along entire length); and G1 apex not particularly long (**Fig. 2A, B**) (vs. G1 apex prominently elongate) (cf. Castro and Ng, 2010).

Trizocarcinus has long been considered as an endemic of the Gulf of Mexico and Caribbean Sea (Chace, 1940). As observed in this paper, we reported the first occurrence of *T. tacitus* from Potiguar Basin

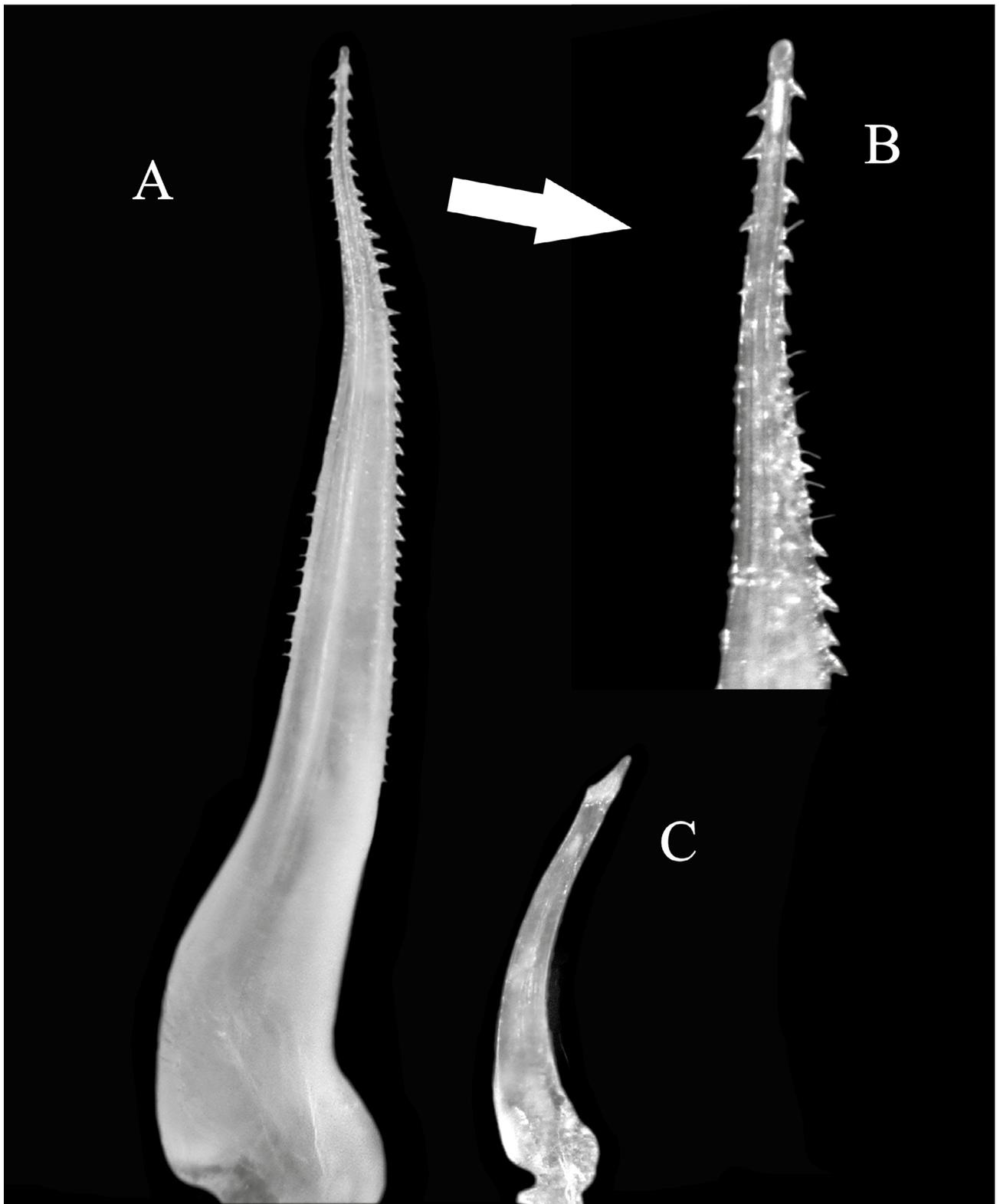


Figure 2. *Trizocarcinus tacitus* Chace, 1940, male (cl: 1.8 cm, cw: 2.1 cm), Potiguar Basin, station MT#63, 416 m, Rio Grande do Norte, northeastern Brazil (MOUFPE 18877). **A**, Right G1; **B**, G1 tip highlighted; **C**, right G2.

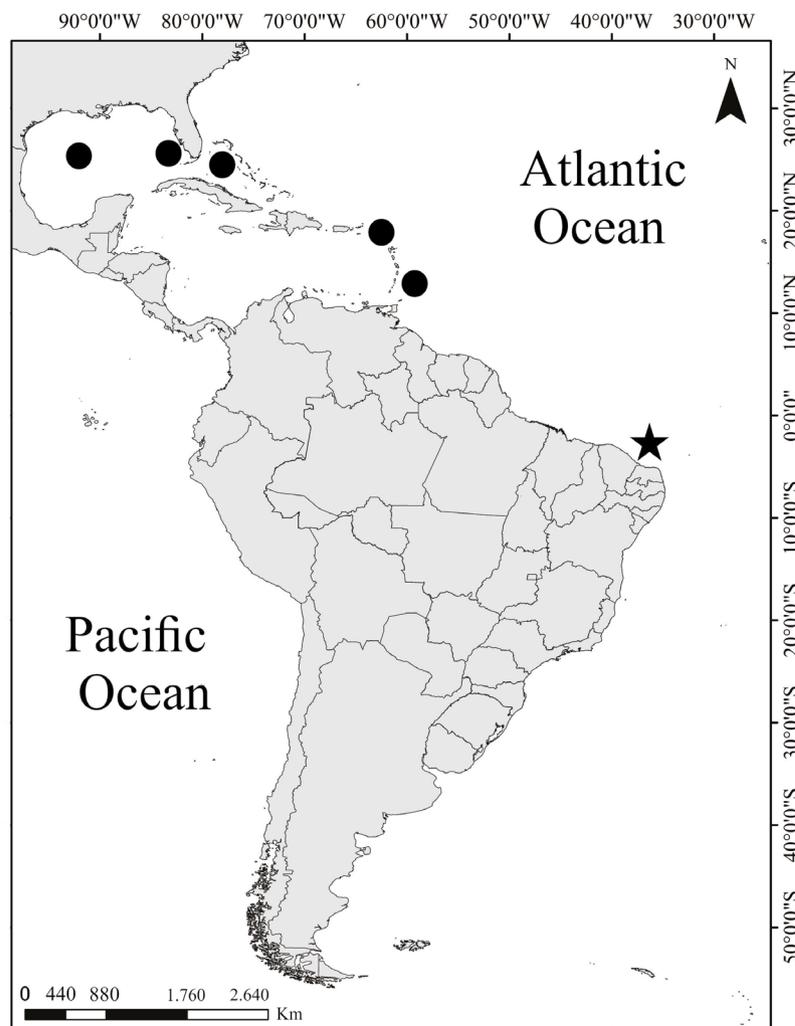


Figure 3. Geographic distribution of *Trizocarcinus tacitus* Chace, 1940 in the Western Atlantic. Black circles = Previous records; Black star = Present new record.

(Brazilian waters) in the South Atlantic. This is a significant range extension of about 3000 km from its previous range. *Trizocarcinus tacitus* is probably more abundant and widely spread than is documented here along the Brazilian coast. The general lack of sampling on the upper continental slope in the Southwestern Atlantic will therefore need to be addressed in the future. As previously discussed by Mantelatto *et al.* (2018), the reasons for the increasing new records and/or extension of distributions reported for decapod species in Brazilian waters during the last decade are almost certainly related to the increase in larger research programs with laboratories more focused on marine biodiversity. In this sense, we argue in favor

of continuity and new investments in biodiversity research programs in order to increase the knowledge of the biota of less explored regions.

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REFERENCES

- Boone, L. 1927. Crustacea from tropical East American seas. Scientific results of the first oceanographic expedition of the "Pawnee" 1925. *Bulletin of the Bingham Oceanographic Collection*, 1: 1–147.
- Castro, P. and Ng, P.K.L. 2010. Revision of the family Euryplacidae Stimpson, 1871 (Crustacea: Decapoda: Brachyura: Goneplacoidea). *Zootaxa*, 2375: 1–130.
- Chace, F.A. 1940. Reports on the scientific results of the *Atlantis* Expeditions to the West Indies, under the joint auspices of the University of Havana and Harvard University. The brachyuran crabs. *Torreia*, 4: 1–67.
- Chace, F.A. 1956. List of mysidacean, amphipod, decapod, and stomatopod crustaceans p. 5–23. In: S. Springer and H.R. Bullis (eds), List of crustaceans, molluscs, and fishes identified from collections made by the exploratory fishing vessel Oregon in the Gulf of Mexico and adjacent seas 1950 through 1955, United States Fish and Wildlife Service Special Scientific Report, Fisheries, 196.
- Guinot, D. 1969. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours, VII. Les Goneplacidae (suite). *Bulletin du Muséum national d'Histoire naturelle (Paris)*, Série 2, 41(2): 507–528.
- Guinot, D. 1971. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours, VIII. Synthèse et bibliographie. *Bulletin du Muséum national d'Histoire naturelle (Paris)*, Série 2, 42(5): 1063–1090.
- McLaughlin, P.A.; Camp, D.K.; Angel, M.V.; Bousfield, E.L.; Brunel, P.; Brusca, R.C.; Cadien, D.; Cohen, A.C.; Conlan, K.; Eldredge, L.G.; Felder, D.L.; Goy, J.W.; Haney, T.; Hann, B.; Heard, R.W.; Hendrickx, E.A.; Hobbs, H.H.; Holsinger, J.R.; Kensley, B.; Laubitz, D.R.; LeCroy, S.E.; Lemaitre, R.; Maddocks, R.F.; Martin, J.W.; Nikkelsen, P.; Nelson, E.; Newman, W.A.; Overstreet, R.M.; Poly, W.J.; Price, W.W.; Reid, J.W.; Robertson, A.; Rogers, D.C.; Ross, A.; Schotte, M.; Schram, F.R.; Shih, C.-T.; Watling, L.; Wilson, G.D.F. and Turgeon, D.D. 2005. Common and scientific names of aquatic invertebrates from the United States and Canada: Crustaceans. Bethesda, Maryland, American Fisheries Society, Special Publication, 545p.
- Mantelatto, F.L.; Terossi, M.; Negri, M.; Buranelli, R.C.; Robles, R.; Magalhães, T.; Tamburus, A.F.; Rossi, N. and Miyazaki, M.J. 2018. DNA sequence database as a tool to identify decapod crustaceans on the São Paulo coastline. *Mitochondrial DNA Part A: DNA Mapping, Sequencing, and Analysis*, 29: 805–815.
- Milne-Edwards, A. 1880. Études préliminaires sur les crustacés, 1^{ère} partie. In: Reports on the results of dredging under the supervision of Alexander Agassiz, in the Gulf of Mexico, and in the Caribbean Sea, 1877, '78, '79, by the U.S. Coast Survey Steamer "Blake", Lieut.-Commander C.D. Sigsbee, U.S.N., and Commander J.R. Bartlett, U.S.N., commanding, VIII. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 8: 1–68.
- Ng, P.K.L.; Guinot, D. and Davie, P. 2008. An annotated checklist of extant brachyuran crabs of the world. *Systema Brachyurorum*, Part I. *Raffles Bulletin of Zoology*, Supplement 17: 1–286.
- Ng, P.K.L.; Priyaja, P.; Kumar, A.B. and Suvarna Devi, S. 2019. On a collection of crabs (Crustacea, Brachyura) from the southwestern coast of India, with a discussion of the systematic position of *Nectopanope* Wood-Mason in Wood-Mason & Alcock, 1891 (Euryplacidae). *Zookeys*, 818: 1–24.
- Rathbun, M.J. 1893. Descriptions of new genera and species of crabs from the west coast of North America and the Sandwich Islands. Scientific Results of Explorations by the U.S. Fish Commission steamer Albatross, no. XXIV. *Proceedings of the U.S. National Museum*, 16: 223–260.
- Rathbun, M.J. 1914. New genera and species of American brachyrhynchous crabs. *Proceedings of the United States National Museum*, 47: 117–129.
- Soto, L.A. 1985. Distributional patterns of deep-water brachyuran crabs in the Straits of Florida. *Journal of Crustacean Biology*, 5: 480–499.
- Soto, L.A. 1986. Deep-water brachyuran crabs of the Straits of Florida (Crustacea, Decapoda). *Anales del Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México*, 13: 1–68.
- Soto, L.A. 1991. Faunal zonation of the deep-water brachyuran crabs in the Straits of Florida. *Bulletin of Marine Science*, 49: 623–637.
- Stimpson, W. 1871. Brachyura. Preliminary report on the Crustacea dredged in the Gulf Stream in the Straits of Florida, by L.F. Pourtales, Assist. U.S. Coast Surveys, Part 1. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 2: 109–160.