

New distributional records of species of the family Pseudorhombilidae Alcock, 1900 (Crustacea: Decapoda) from Brazilian waters

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ABSTRACT

The family Pseudorhombilidae Alcock, 1900 is widely distributed in the tropical western Atlantic, occurring from shallow waters to the continental slope, inhabiting sandy, gravelly, or muddy substrates. Despite the broad distribution of this family in the Americas, the species *Pseudorhombila octodentata* Rathbun, 1906 and *Pseudorhombila quadridentata* (Latreille, 1828) have been observed only in a few localities, with disjunct records, and *Robertsella meridionalis* Tavares and Gouvêa, 2013 has been recorded only in one type locality (Santa Catarina, Brazil). The present work reports

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new occurrences of *P. octodentata* from the state of Sergipe and *P. quadridentata* from the state of Amapá, and the second occurrence of *R. meridionalis* from the state of Rio Grande do Norte, Brazil. These new records are an important contribution to the understanding of distributional patterns of pseudorhombilid crab species in Brazil and to the increase in biodiversity data of crustaceans from the North and Northeast regions of Brazil.

KEYWORDS

Brachyura, *Pseudorhombila octodentata*, *Pseudorhombila quadridentata*, *Robertsella meridionalis*, Western Atlantic

INTRODUCTION

The family Pseudorhombilidae Alcock, 1900, comprises 16 genera and 43 species, which are widely distributed in the western Atlantic, with several records provided by A. Milne-Edwards (1880), Chace (1939), Guinot (1969a), Hernández Aguilera (1982), Williams (1984), Hendrickx (1998), Nizinski (2003), and Felder (2020). Pseudorhombilid crabs occur from the intertidal zone to 900 m depth (Pequegnat, 1970; Hendrickx, 1998; Felder *et al.*, 2009), especially under rocks and in sandy or muddy substrates (Guinot, 1969b; Pequegnat, 1970; Powers, 1977).

Among the genera of this family, *Pseudorhombila* H. Milne Edwards, 1837, contains five species: *Pseudorhombila guinotae* Hernández Aguilera, 1982; *Pseudorhombila octodentata* Rathbun, 1906; *Pseudorhombila ometlanti* Vázquez-Bader and Gracia, 1995; *Pseudorhombila quadridentata* (Latreille, 1828); and *Pseudorhombila xanthiformis* Garth, 1940. These species are widely distributed in the Gulf of Mexico and the Caribbean Sea, occurring on the continental shelf on sand, gravel, and shell substrates (Martínez-Iglesias and Gómez, 1994; Vázquez-Bader and Gracia, 1995). Despite their broad distribution in the western Atlantic, only the species *P. octodentata* and *P. quadridentata* have previously been recorded from Brazilian waters (Melo, 1996; 2010; Silva and Calado, 2002; Coelho *et al.*, 2008; Boos *et al.*, 2012).

The genus *Robertsella* Guinot, 1969a, is composed of two species, *Robertsella mystica* Guinot, 1969a, and *Robertsella meridionalis* Tavares and Gouvêa, 2013, which are distributed only in the western Atlantic, on soft bottoms (mud or sand) at depths > 300 m; *R. mystica* has been recorded from South Carolina, Gulf

of Mexico, Florida, and the Dry Tortugas (Guinot, 1969a; Powers, 1977; Hendrickx, 1998; Ng *et al.*, 2008; Felder *et al.*, 2009; Tavares and Gouvêa, 2013), and *R. meridionalis* has been recorded only from Brazil, in the state of Santa Catarina (Tavares and Gouvêa, 2013). The present work reports new occurrences of *P. octodentata* from the state of Sergipe and *P. quadridentata* from the state of Amapá, and the second occurrence of *R. meridionalis* from the state of Rio Grande do Norte, Brazil.

MATERIAL AND METHODS

Pseudorhombila species were collected from September 1999 to October 2001 during the Revizee project [Assessment of the Sustainable Potential of Living Resources of the Exclusive Economic Zone (Northern and Northeastern Brazil)], under supervision of the Center for Research and Management of Fishery Resources of the North Coast (CEPNOR) and National Center for Research and Conservation of Marine Biodiversity of the Northeast (CEPENE/ICMBio). Samples were obtained from two principal regions: 1) northern Brazil (Revizee Score/North), off the states of Amapá to Piauí, on board the “R/V *Almirante Paulo Moreira*”, at 0–180 m depth, 30–40 minutes of trawl using a 15 m mouth width commercial fishing net (otter trawl net with 118 mm mesh aperture); 2) northeastern Brazil, (Revizee Score/Northeast), off the states of Piauí to Bahia, including the islands of Saint Peter and Saint Paul Archipelago and Fernando de Noronha Archipelago, on board of the “R/V *Natureza*”, at 0–150 m depth, using Steel-framed bottom traps with a 110 mm mesh aperture.

The *R. meridionalis* specimen was collected as part of a project for evaluation of benthic and planktonic biota in the offshore portion of the Potiguar and Ceará basins (Bpot), developed by the Brazilian oil company Petrobras (Petróleo Brasileiro S/A) on board the R/V *Seward Johnson* in May 2011 in Potiguar Basin, encompassing the states of Ceará (CE) and Rio Grande do Norte (RN), Northeast region of Brazil. The specimen was collected using a semi-balloon otter trawl net (50 mm mesh aperture and 18 m of mouth opening) at depths between 150 m and 2068 m, with 30 minutes trawling at each station.

The collected specimens were sorted, preserved in 70 % ethanol, and identified to the species level with the aid of relevant descriptions provided by Guinot (1969a), Hernández Aguilera (1982), and Tavares and Gouvêa (2013). In addition, many other papers were used to form a synonymic list that assisted in filling the gaps on the geographic and bathymetric information for each species examined. All specimens were evaluated for carapace length (CL) and carapace width (CW), which were measured with a digital caliper (± 0.01 mm). All material was deposited in the Carcinological Collection of the “Museu de Oceanografia Professor Petrônio Alves Coelho (MOUFPE)” of the Federal University of Pernambuco, Recife, Brazil.

SYSTEMATICS

Family Pseudorhombilidae Alcock, 1900

Genus *Pseudorhombila* H. Milne Edwards, 1837

Pseudorhombila octodentata Rathbun, 1906 (Figs. 1A–E, 4A–B, 5)

Pseudorhombila octodentata Rathbun, 1906: 91. — Rathbun, 1918: 43, figs. 17, 18, pl. 14. — Chace, 1940: 48. — Guinot, 1969a: 704, figs. 113–115, pl. 3, fig. 2. — Gómez and Ortiz, 1976: 9 (in list). — Hernández Aguilera, 1982: 2, figs. 1A, 2A, 3A, 4A, 5A, 6A. — Coelho and Coelho-Filho, 1993: 560 (in list). — Martínez-Iglesias and Gómez, 1994: 26, figs. 1–3. — Hendrickx, 1995: 14, figs. 1A, 2A, 3D. — Melo, 1996: 413. — Boschi, 2000: 122 (in list). — Melo, 2010: 47 (in list). — Boos et al. 2012: 1026 (in list).

Material examined. 1 male (CL = 50.7 mm; CW = 40.13 mm), Revizee/NE (Cruzeiro 3), R/V *Natureza* col., Sergipe, Station #3, (10°41'S 36°19'W), 27 October 2000, 130 m, gravel bottom, MOUFPE: 19993.

Geographic distribution. Western Atlantic: Cuba (Punta Alegre), Lesser Antilles, Dominica, and Brazilian states of Sergipe (present record), Rio de Janeiro, São Paulo, and Rio Grande do Sul (Melo, 1996; 2010; Boos et al., 2012) (Fig. 5).

Remarks. The characteristics of the examined material were consistent with the original description provided by Rathbun (1906) and additional taxonomic information provided by Guinot (1969a) and Hernández Aguilera (1982) for specimens collected in the islands of Central America. *Pseudorhombila octodentata* differs from the other species occurring in Brazil (*P. quadridentata*) in the following characters: antero-lateral margin with four teeth (*vs.* two teeth in *P. quadridentata*) (Figs. 1A; 2A); ocular peduncle with acute lateral granules (*vs.* less pronounced in *P. quadridentata*); the external surface of the third maxilliped is granulated (*vs.* smooth or little granulated in *P. quadridentata*) (Figs. 1C; 2C); merus of the third ambulatory legs with strong and acute spines (*vs.* granulated in *P. quadridentata*); the first and second pleonal somites are corrugated (*vs.* only the first pleonal somite is corrugated in *P. quadridentata*) (Figs. 1D; 2D); well-developed gonopod 1 (G1), convergent at midline of thoracic sternum, slightly curved, and with few spines at the tip (*vs.* strongly curved, with several spines at the tip, and showing an apex elevation in *P. quadridentata*) (Fig. 4A–D) (see more details in Guinot, 1969a; Hernández Aguilera, 1982). *Pseudorhombila octodentata* presents a similar geographic distribution to that of *P. quadridentata* (Fig. 5), although *P. octodentata* does not occur in the Gulf of Mexico, only in the South and Southwest regions of Brazil (see *P. octodentata* distribution topic). However, considering the vertical distribution, *P. quadridentata* occurs more commonly in shallow waters (between 20 and 64 m) (see remarks under *P. quadridentata*), and *P. octodentata* has a bathymetric distribution between 180 and 329 m (Chace, 1940; Gómez and Ortiz, 1976; Martínez-Iglesias and Gómez, 1994).

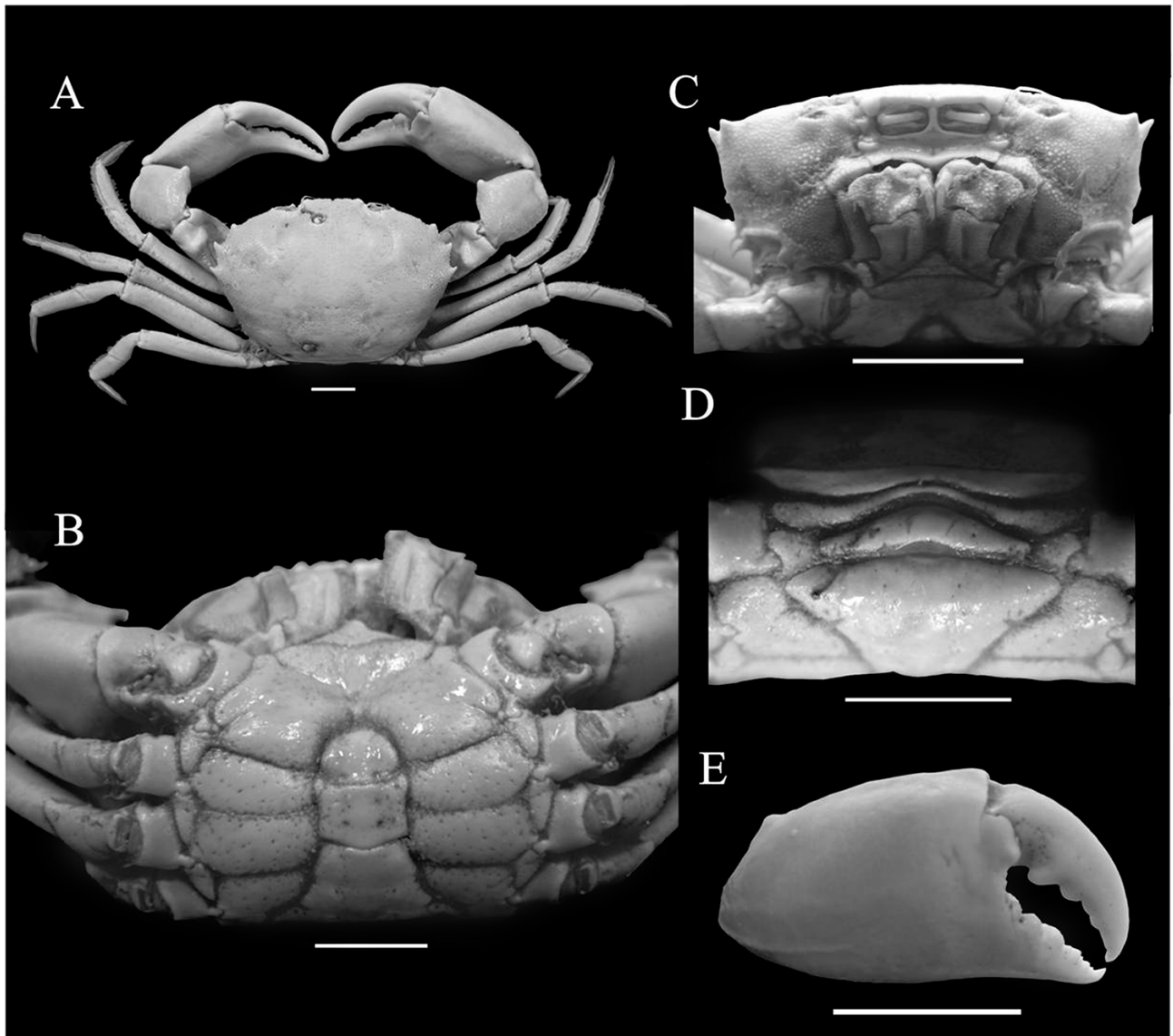


Figure 1. *Pseudorhombila octodentata* Rathbun, 1906, male; dorsal habitus (A), thoracic sternum, abdominal somites and telson (B), frontal view (C), pleonal somites 1–3, right cheliped (P1) (D), 130 m, MOUFPE: 19993. Scale bar: 1 cm.

The examined specimen was found at 130 m, thus providing a new shallow record for this species. It is also the first record of this species in the Northeast region of Brazil.

***Pseudorhombila quadridentata* (Latreille, 1828)**
(Figs. 2A–E, 4C–D, 5)

Melia quadridentata Latreille, 1828: 706.

Pseudorhombila quadridentata. —Guinot, 1969a: 704, fig. 112, pl. 3, fig. 1. —Hernández Aguilera, 1982: 2, figs. 1C, D, 2C, 3C, 4C, 5C, 6C. —Martínez-Iglesias and Gómez, 1994: 29, figs. 4–6.

—Hendrickx, 1995: 14, fig. 3C. —Melo, 1996: 413. —Boschi, 2000: 122 (in list). —Silva and Calado, 2002: 116, fig. 1. —Coelho *et al.*, 2008: 35 (in list). —Felder *et al.*, 2009: 1084 (in list).

Material examined. 2 males (CL = 45–48 mm; CW = 38–41 mm), Revizee/Norte, R/V *Almirante Paulo Moreira* col., Amapá, Station #11, (3°40'N 50°25'W), 12 September 1999, 114 m, gravel bottom, MOUFPE: 19994.

Geographic distribution. USA (Florida), Gulf of Mexico, Cuba, West Indies, Mexico, Colombia (Atlantic side), and Brazilian states of Amapá (present

record), Alagoas, and Bahia (Abrolhos) (Martínez-Iglesias and Gómez, 1994; Melo, 1996; Silva and Calado, 2002; Coelho *et al.*, 2008) (Fig. 5).

Remarks. The characteristics of the *P. quadridentata* specimens examined were consistent with the original description provided by Latreille (1828) and additional remarks prepared by Rathbun (1906), Guinot (1969a), and Hernández Aguilera (1982). *Pseudorhombila quadridentata* is widely distributed in the western Atlantic, which is similar to other closely related species (see remarks of *P. octodentata*), however, with disjunct records especially in the Caribbean Sea (recorded only from Colombia) and in Brazil (only two previous records, in the states of Alagoas

and Bahia), but it is a common species in the Gulf of Mexico (see Fig. 5). In Brazil, these records were made by Melo (1996) and Silva and Calado (2002), between the depths of 20 and 64 m, on bottoms of gravel and mud along the continental shelf. However, in the present work, the specimens were found at a depth of 114 m, increasing the bathymetric distribution to deeper waters. Coelho *et al.* (2008) compiled several records of brachyuran and anomuran crabs from Brazilian waters, however, these records were only based on published literature (without examined material). Thus, the present work is the first record of *P. quadridentata* from the North region of Brazil (state of Amapá) and only the second record after 18 years for this species.

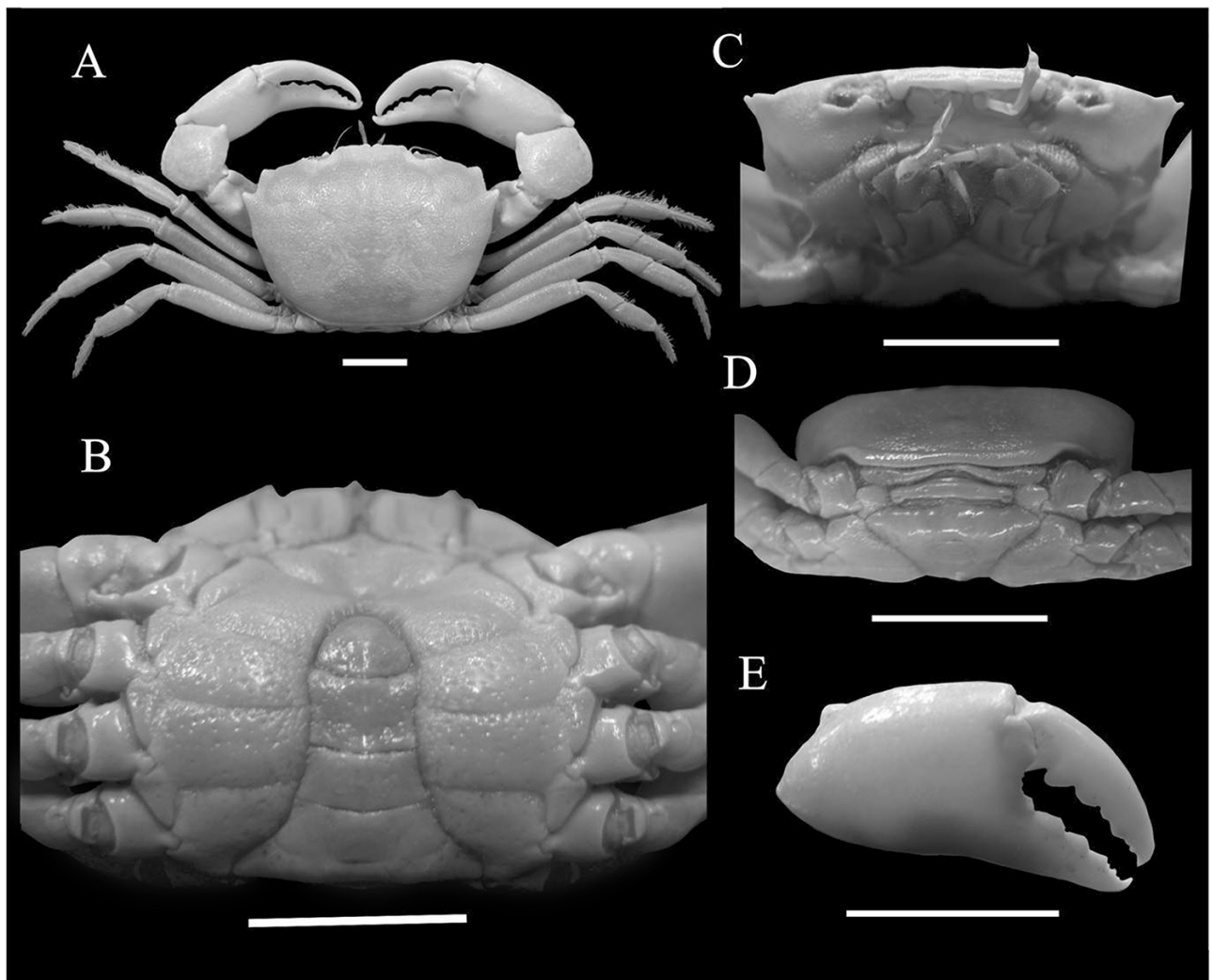


Figure 2. *Pseudorhombila quadridentata* (Latreille, 1828), male; dorsal habitus (A), thoracic sternum, abdominal somites and telson (B), frontal view (C), pleonal somites 1–3, right cheliped (P1) (D), 114 m, MOUFPE: 19994. Scale bar: 1 cm.

Robertsella* Guinot, 1969a**Robertsella meridionalis* Tavares and Gouvêa, 2013**

(Figs. 3A–E, 4E, F, 5)

Robertsella meridionalis Tavares and Gouvêa, 2013: 72, figs. 1A–D, 2A–D, 3A, C, 4A–B.

Material examined. 1 male (CL = 12.21 mm; CW = 16.86 mm), Bpot (Potiguar Basin), R/V *Seward Johnson* col., Rio Grande do Norte, Station #MT-52 (04°44'S 36°25'W), date: 23 May 2011, 180 m of depth, gravel bottom, MOUFPE: 19231.

Geographic distribution. Western Atlantic: Brazilian states of Rio Grande do Norte (Potiguar Basin — present record) and Santa Catarina (Tavares and Gouvêa, 2013) (Fig. 5).

Remarks. The characteristics of the *R. meridionalis* specimens were consistent with the original description provided by Tavares and Gouvêa (2013), who listed some morphological differences between the only two described species of the genus *Robertsella*. The species of *R. meridionalis* can be distinguished from *R. mystica* by the following characters: strongly deflexed frontal region of carapace (Fig. 3B)

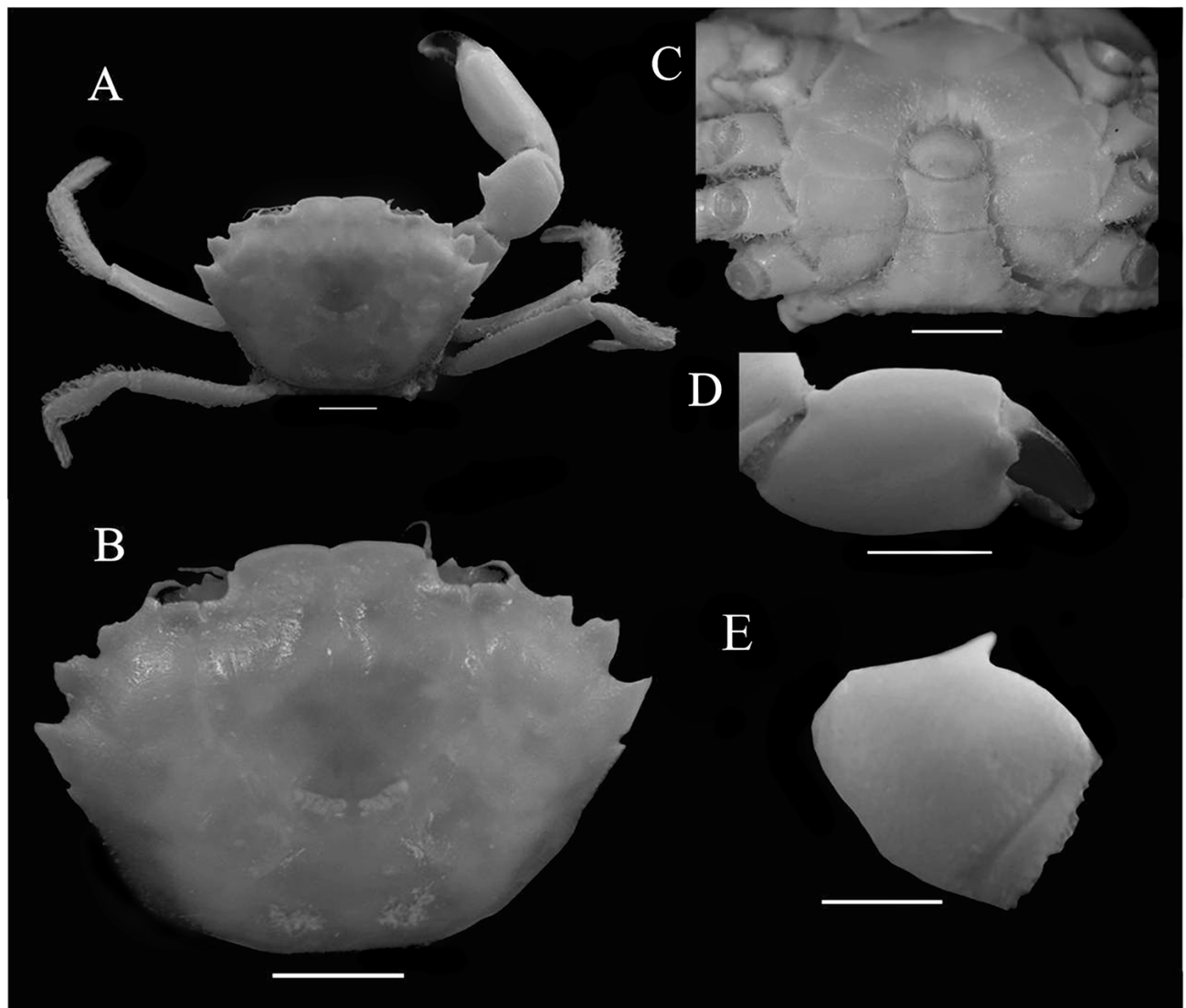


Figure 3. *Robertsella meridionalis* Tavares and Gouvêa, 2013, male; dorsal habitus (A), Carapace, dorsal view (B), thoracic sternum, pleonal somites and telson (C), right cheliped (P1) (D), carpus detail (E), 180 m, MOUFPE: 19231. Scale bar: 1 cm.

(vs. a distinctly less deflected frontal region of carapace in *R. mystica*); densely and coarsely tuberculate cheliped ischial ridge (vs. less tuberculate cheliped ischial ridge); the merus of the pereiopods P2–P5 is densely and coarsely tuberculate ventrally (vs. the merus of the ventral surface of P2–P5 is smooth); the abdominal suture 5/6 is well above the thoracic sternal suture 6/7 (Fig. 3C) (vs. abdominal suture 5/6 and thoracic sternal suture 6/7 aligned with each other); portion of the thoracic sternite 8 not covered by the lateral expansion of the third abdominal somite (Fig.

3C) (vs. proportionally larger) (see more characteristics in Tavares and Gouvêa, 2013). The genus *Robertsella* was recorded only once in the original description of *R. meridionalis* provided by Tavares and Gouvêa (2013), specifically from the southern region of Brazil (state of Santa Catarina) from a depth of 400 m. Thus, the present work provides a second report of the species *R. meridionalis* from Brazil (Northeast region - Potiguar Basin) at about 4,200 km distance from the type locality and increases the bathymetric distribution range for this species to 180–400 m.



Figure 4. Gonopod 1 (G1) of male specimens: *Pseudorhombila octodentata* Rathbun, 1906 (A), *P. octodentata* (G1) distal region in detail (B), *Pseudorhombila quadridentata* (Latreille, 1828) (C), *P. quadridentata* (G1) distal region in detail (D), *Robertsella meridionalis* Tavares and Gouvêa, 2013 (E), *R. meridionalis* (G1) distal region in detail (F). Scale bar: 0.5 mm.

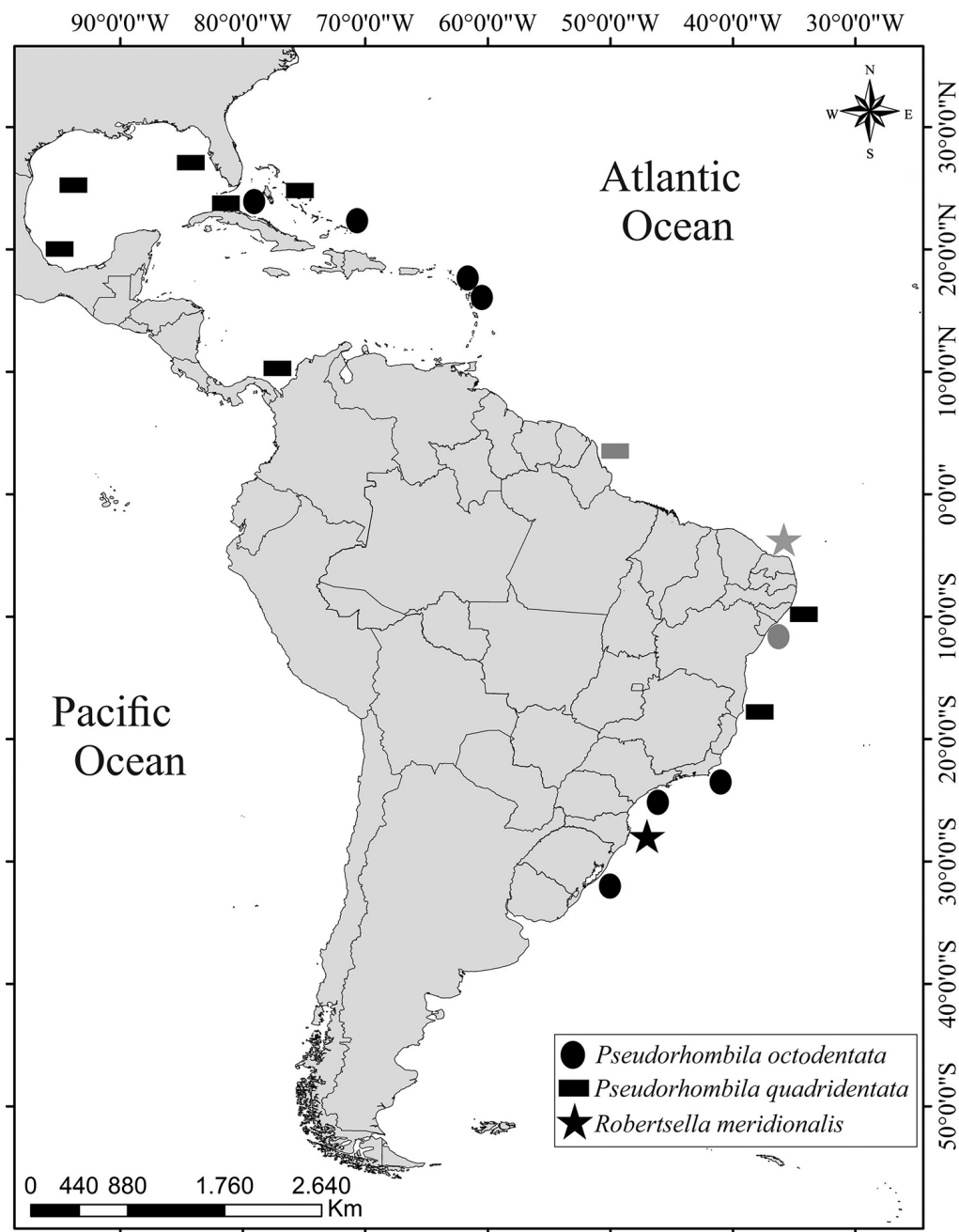


Figure 5. Geographic distribution of the Pseudorhombilidae from the Western Atlantic: *Pseudorhombila octodentata* Rathbun, 1906 (circle); *P. quadridentata* (Latreille, 1828) (square); *Robertsella meridionalis* Tavares and Gouvêa, 2013 (star). Black symbols = previous records; Gray symbols = new records.

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REFERENCES

- Alcock, A. 1900. Materials for a carcinological fauna of India. No. 6. The Brachyura Catometopa or Grapsoidea. *Journal of the Asiatic Society of Bengal*, 69: 279–456.
- Boschi, E.E. 2000. Species of decapod crustaceans and their distribution in the American marine zoogeographic provinces. *Revista de Investigación y Desarrollo Pesquero*, 13: 7–136.
- Boos, H.; Bond Backup, G.; Backup, L.; Araujo, P.B.; Magalhães, C.; Almeirão, M.P.; Santos, R.A. dos and Mantelatto, F.L.M. 2012. Checklist of the Crustacea from the state of Santa Catarina, Brazil. *Check List*, 8: 1020–1046.
- Chace, F.A. 1939. Reports on the scientific results of the first Atlantis Expedition to the West Indies, under the joint auspices of the University of Havana and Harvard University preliminary descriptions of one new genus and seventeen new species of decapod and stomatopod Crustacea. *Memorias de la Sociedad Cubana de Historia Natural*, 13: 31–54.
- 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: 3–67.
- Coelho, P.A. and Coelho-Filho, P.A. 1993. Proposta de classificação da família Xanthidae (Crustacea, Decapoda, Brachyura) através da taxonomia numérica. *Revista brasileira de Zoologia*, 10: 559–580.
- Coelho, P.A.; Almeida, A.O. and Bezerra, L.E.A. 2008. Checklist of the marine and estuarine Brachyura (Crustacea: Decapoda) of northern and northeastern Brazil. *Zootaxa*, 1956: 1–58.
- Felder, D.L.; Álvarez, F.; Goy, J.W. and Lemaitre, R. 2009. Decapoda (Crustacea) of the Gulf of Mexico, with comments on the Amphionidacea. p. 1019–1104. In: J.W. Tunnell Jr.; D.L. Felder and S.A. Earle (eds), *Gulf of Mexico Origin, Waters and Biota*, vol. 1. Biodiversity. Texas A&M University Press, College Station, Chapter 59.
- Felder, D.L. 2020. A new crab of the genus *Nanoplax* from the Gulf of Mexico, and assignment of *Micropanope pusilla* to a new genus (Crustacea, Brachyura, Pseudorhombilidae). *Zootaxa*, 4810: 531–545.
- Garth, J.S. 1940. Some new species of brachyuran crabs from Mexico and the Central and South American mainland. In: Reports of the Collections Obtained by Allan Hancock Pacific Expeditions of Velero III off the Coast of Mexico, Central American, South America, and Galapagos Islands in 1932, in 1933, in 1934, in 1935, in 1936, in 1937, in 1938, in 1939, and in 1940. *Allan Hancock Pacific Expeditions*, 5: 51–127.
- Gómez, O. and Ortiz, M. 1976. Lista de braquiurus cubanos. *Ciencias Series*, 8(25): 3–20.
- Guinot, D. 1969a. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. VII. Les Goneplacidae (suite et fin). *Bulletin du Muséum National d'Histoire Naturelle, Paris*, 2^e série, 41(3): 688–724, pls. III–V.
- Guinot, D. 1969b. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyours. VII. Les Goneplacidae. *Bulletin du Muséum National d'Histoire Naturelle, Paris*, 2^e série, 41(1): 241–265, pl. I.
- Hendrickx, M.E. 1995. Restitution de *Pseudorhombila xanthiformis* Garth 1940, pour *Nanoplax garth* Guinot, 1969 (Decapoda: Goneplacidae). *Crustaceana*, 68: 12–20.
- Hendrickx, M.E. 1998. A new genus and species of “goneplacid-like” brachyuran crab (Crustacea: Decapoda) from the Gulf of California, Mexico, and a proposal for the use of the family Pseudorhombilidae Alcock, 1900. *Proceedings of the Biological Society of Washington*, 3: 634–644.
- Hernández Aguilera, J.L. 1982. *Pseudorhombila guinotae* un nuevo crustáceo (Decapoda, Goneplacidae) en la cosla Este de Mexico. *Investigaciones Oceanograficas/Biologia*, 1(4): 1–16.
- Latreille, P.A. 1828. *Encyclopédie Méthodique. Histoire Naturelle. Entomologie, ou Histoire naturelle des Crustacés, des Arachnides et des Insectes*. Paris, Agasse, vol. 10, Part 2: 345–832.
- Martínez-Iglesias, J.C. and Gómez, O. 1994. Las especies del género *Pseudorhombila* H. Milne Edwards, 1837 (Crustacea: Decapoda: Goneplacidae) en las aguas cubanas. *Avicennia: Revista de Ecología, Oceanología y Biodiversidad Tropical*, 2: 25–31.
- Melo, G.A.S. 1996. Manual de Identificação dos Brachyura, Caranguejos e Siris do Litoral Brasileiro. Editora Plêiade, Fundação de Amparo a Pesquisa do Estado de São Paulo, São Paulo, 604p.
- Melo, G.A.S. 2010. The brachyura (Crustacea: Decapoda) collected by the GEDIP Project between Torres, Rio Grande do Sul (Brazil) and Maldonado (Uruguay). *Atlântica, Rio Grande*, 32: 39–57.
- Milne-Edwards, A. 1880. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico and in the Caribbean Sea, 1877, 1878, 1879, by the United States Coast Survey Steamer “Blake” VIII. Études préliminaires sur les Crustacés. *Bulletin Museum of Comparative Zoology*, 8: 1–68.
- Milne Edwards, H. 1837. Histoire naturelle des crustacés: comprenant l’anatomie, la physiologie et la classification de ces animaux. Paris, Librairie encyclopédique de Roret, Vol. 2 (1837), p. 1–531; Atlas (1837), p. 1–32, pls. 1–42.
- Ng, P.K.L.; Guinot, D. and Davie, P.J.F. 2008. Systema Brachyurorum: Part I. An annotated checklist of extant brachyuran crabs of the world. *Raffles Bulletin of Zoology*, 17: 1–296.
- Nizinski, M.S. 2003. Annotated checklist of decapod crustaceans of Atlantic coastal and continental shelf waters of the United States. *Proceedings of the Biological Society of Washington*, 116: 96–157.
- Pequegnat, L.H. 1970. Deep-water brachyuran crabs. Contributions of the biology of the Gulf of Mexico. *Texas A&M University Ocean Studies*, 1: 171–204.
- Powers, L.W. 1977. A catalogue and bibliography to the crabs (Brachyura) of the Gulf of Mexico. Port Aransas Marine Lab., Texas (USA), University of Texas, Contributions in Marine Science Institute, 20, 190p.
- Rathbun, M.J. 1906. Description of a new crab from Dominica, West Indies. *Proceedings of the Biological Society of Washington*, 19: 91–92.
- Rathbun, M.J. 1918. The grapsoid crabs of Americas. *Bulletin United States National Museum*, 97: 1–461.
- Silva, E.B. and Calado, T.C.S. 2002. Ocorrência de *Pseudorhombila quadridentata* (Latreille, 1828) (Crustacea: Decapoda: Brachyura: Goneplacidae) no Estado de Alagoas. *Boletim de Estudos de Ciências do Mar, Maceió*, 12: 113–117.

- Tavares, M. and Gouvêa, A. 2013. A new species of *Robertsella* Guinot, 1969 (Crustacea: Brachyura: Panopeidae) from the southwestern Atlantic. *Zootaxa*, 3734: 72–80.
- Vazquez-Bader, A.R. and Gracia, A. 1995. A new crab species of the genus *Pseudorhombila* H. Milne-Edwards, 1837 (Crustacea: Decapoda: Goneplacidae). *Proceedings of the Biological Society of Washington*, 108: 254–265.
- Williams, A.B. 1984. Shrimps, lobsters and crabs of the Atlantic coast of the eastern United States, Maine to Florida. Washington, Smithsonian Institution Press, 550p.