

Sea slugs (Gastropoda: Heterobranchia) from Rio Grande do Norte, Northeastern Brazil

Marlon Delgado^{1,8}; Fúlvio Aurélio de Moraes Freire^{2,9};
Carlos Augusto Oliveira de Meirelles^{3,10}; Rosângela Gondim D'Oliveira^{4,11}; Vinicius Padula^{5,12};
Juliana Bahia^{6,13} & Simone Nunes Brandão^{7,14}

- ¹ Universidade Federal do Rio Grande do Norte (UFRN), Centro de Biotecnologia (CB), Departamento de Oceanografia e Limnologia (DOL), Laboratório de Macroalgas Marinhas (LabMac). Natal, RN, Brasil.
- ² Universidade Federal do Rio Grande do Norte (UFRN), Centro de Biotecnologia (CB), Grupo de Estudos de Ecologia e Fisiologia de Animais Aquáticos (GEEFAA). Natal, RN, Brasil.
- ³ Universidade Federal do Ceará (UFC), Centro de Ciências, Departamento de Biologia, Laboratório de Invertebrados Marinhos do Ceará (LIMCE). Fortaleza, CE, Brasil.
- ⁴ Universidade Federal do Rio Grande do Norte (UFRN), Centro de Biotecnologia (CB), Laboratório de Invertebrados Bentônicos (LIB). Natal, RN, Brasil.
- ⁵ Universidade Federal do Rio de Janeiro (UFRJ), Museu Nacional (MN), Departamento de Invertebrados. Rio de Janeiro, RJ, Brasil.
- ⁶ Staatlichen Naturwissenschaftlichen Sammlungen Bayerns (SNSB), Bavarian State Collection of Zoology, Zoologische Staatssammlung München (ZSM). München, Germany.
- ⁷ Universidade Estadual de Santa Cruz (UESC), Departamento de Ciências Biológicas (DCB), Programa de Pós-Graduação em Zoologia (PPGZOO). Ilhéus, BA, Brasil.
- ⁸ ORCID: <https://orcid.org/0000-0003-3746-5824>. E-mail: marlondelg@gmail.com (corresponding author)
- ⁹ ORCID: <https://orcid.org/0000-0003-1580-0222>. E-mail: fulvio.freire@ufrn.br
- ¹⁰ ORCID: <https://orcid.org/0000-0002-5870-7338>. E-mail: cameirelles@gmail.com
- ¹¹ ORCID: <https://orcid.org/0000-0003-3049-9730>. E-mail: rosangnatal@gmail.com
- ¹² ORCID: <https://orcid.org/0000-0003-0703-9541>. E-mail: padula@mn.ufrj.br
- ¹³ ORCID: <https://orcid.org/0000-0003-3190-2974>. E-mail: ju.bahia@yahoo.com
- ¹⁴ ORCID: <https://orcid.org/0000-0002-3487-6129>. E-mail: brandao.sn.100@gmail.com

Abstract. Heterobranch sea slugs (Gastropoda) present reduction, internalization, or absence of shell, and include more than 6,000 described species. Approximately 250 species are recorded from Brazil but only 14 had been previously recorded from Rio Grande do Norte, on the Brazilian northeastern coast. As a result of different expeditions conducted between 2008 and 2020, 41 species were collected and identified. Among them, five species were recorded for the first time from the South Atlantic Ocean: *Chelidonura hirundinina* (Quoy & Gaimard, 1833); *Sclerodoris prea* (Ev. Marcus & Er. Marcus, 1967); *Thuridilla malaquita* Ortea & Buske, 2014; *Berthella nebula* Ghanimi, Schrödl, Goddard, Ballesteros, Gosliner & Valdés, 2020 and *Berthella vialactea* Ghanimi, Schrödl, Goddard, Ballesteros, Gosliner & Valdés, 2020. Thirty-six species are recorded for the first time from Rio Grande do Norte. The present survey expands the knowledge of the diversity of sea slugs from Brazil and supports the hypothesis of similarity between the heterobranch sea slug fauna from the northeastern Brazil and the Caribbean Sea.

Keywords. Mollusca; Nudibranchia; Sacoglossa; New records; Geographical distribution.

INTRODUCTION

Heterobranch mollusks are popularly known as sea slugs and comprise about 4% the gastropod species (Bieler, 1992). They occur in diverse habitats and substrates, including macroalgae, rocky shores, coral reefs and are distributed from the poles to the tropical regions. Around 6,000 described species are known, of these 250 – excluding pelagic species – are recorded from Brazil,

and 124 from the northeastern Brazilian coast (Padula & Absalão, 2005; García *et al.*, 2008; Rios, 2009; Padula & Delgado, 2010; Alvim & Pimenta, 2011; Lima & Delgado, 2011; Cunha, 2011; Sales *et al.*, 2011, Padula *et al.*, 2012; Alvim & Pimenta, 2013; Sales *et al.*, 2013; Silva *et al.*, 2013; Cunha *et al.*, 2014; Alvim & Pimenta, 2015; Galvão-Filho *et al.*, 2015).

Rio Grande do Norte is a tropical region in northeastern Brazil covering 410 km of sandy

Table 1. Heterobranch sea slug species found at Rio Grande do Norte State with remarks to the new records.

SPECIES	NEW RECORD			
	South Atlantic	Brazil	Northeast Brazil	RN state
Class Gastropoda Cuvier, 1795				
Subclass Heterobranchia Burmeister, 1837				
ACTEONIMORPHA Bouchet et al., 2017				
Family APLUSTRIDAE Gray, 1847				
01. <i>Micromelo undatus</i> (Bruguière, 1792)				
Order CEPHALASPIDEA P. Fischer, 1883				
Family HAMINOEIDAE Pilsbry, 1895b				
02. <i>Haminoea antillarum</i> (d'Orbigny, 1841)				
Family AGLAJIDAE Pilsbry, 1895				
03. <i>Camachoaglaja berolina</i> (Er. Marcus & Ev. Marcus, 1970)				
04. <i>Chelidonura hirundinina</i> (Quoy & Gaimard, 1833)				
05. <i>Navanax gemmatus</i> (Mörch, 1863)				
Superorder SACOGLOSSA Ihering, 1876				
Family VOLVATELLIDAE Pilsbry, 1895				
06. <i>Ascobulla ulla</i> (Ev. Marcus & Er. Marcus, 1970)				
Family OXYNOIDAE Stoliczka, 1868				
07. <i>Oxynoe antillarum</i> Mörch, 1863				
Family PLAKOBRANCHIDAE Gray, 1840				
08. <i>Elysia canguzua</i> Er. Marcus, 1955				
09. <i>Elysia pawliki</i> Krug, Vendetti & Valdés, 2016				
10. <i>Elysia subornata</i> A.E. Verrill, 1901				
11. <i>Thuridilla malaquita</i> Ortea & Buske, 2014				
Family HERMAEIDAE H. Adams & A. Adams, 1854				
12. <i>Caliphylla mediterranea</i> A. Costa, 1867				
Order APLYSIIDA Bouchet et al., 2017				
Family APLYSIIDAE Lamarck, 1809				
13. <i>Aplysia cervina</i> (Dall & Simpson, 1901)				
14. <i>Aplysia dactylomela</i> Rang, 1928				
15. <i>Bursatella leachii</i> Blainville, 1817				
16. <i>Phyllaplysia engeli</i> Er. Marcus, 1955				
Order PLEUROBRANCHIDA Bouchet et al., 2017				
Family PLEUROBRANCHIDAE Gray, 1827				
17. <i>Berthella agassizi</i> (MacFarland, 1909)				
18. <i>Berthella nebula</i> Ghanimi, Schrödl, Goddard, Ballesteros, Gosliner & Valdés, 2020				
19. <i>Berthella vialactea</i> Ghanimi, Schrödl, Goddard, Ballesteros, Gosliner & Valdés, 2020				
20. <i>Berthellina ignis</i> Alvim & Pimenta, 2015				
Order NUDIBRANCHIA Cuvier, 1817				
Family CADLINIDAE Bergh, 1891				
21. <i>Cadlina rumia</i> Er. Marcus, 1955				
Family CHROMODORIDIDAE Bergh, 1891				
22. <i>Felimida clenchi</i> (Russel, 1935)				
23. <i>Felimare</i> sp.				
24. <i>Tyrinna evelinae</i> (Er. Marcus, 1958)				
Family DISCODORIDIDAE Bergh, 1891				
25. <i>Diaulula greeleyi</i> (MacFarland, 1909)				
26. <i>Discodoris branneri</i> MacFarland, 1909				
27. <i>Geitodoris pusae</i> (Er. Marcus, 1955)				
28. <i>Sclerodoris prea</i> (Ev. Marcus & Er. Marcus, 1967)				
29. <i>Taringa iemanja</i> Alvim & Pimenta, 2013				
30. <i>Taringa telopia</i> Er. Marcus, 1955				
Family DORIDIDAE Rafinesque, 1815				
31. <i>Doris kyolis</i> (Ev. Marcus & Er. Marcus, 1967)				
32. <i>Doris</i> sp.				
Family DOTIDAE Gray, 1853				
33. <i>Doto chica</i> Marcus & Marcus, 1960				
34. <i>Doto divae</i> Marcus & Marcus, 1960				
Family FACELINIDAE Bergh, 1889				
35. <i>Phidiana lynceus</i> Bergh, 1867				
36. <i>Cratena minor</i> Padula, Araújo, Matthews-Cascon & Schrödl, 2014				
Family AEOLIDIIDAE Gray, 1827				
37. <i>Berghia creutzbergi</i> Er. Marcus & Ev. Marcus, 1970				
38. <i>Berghia rissodominguezi</i> Muniain & Ortea, 1999				
39. <i>Spurilla braziliana</i> MacFarland, 1909				
Family GLAUCIDAE Gray, 1827				
40. <i>Glaucus atlanticus</i> Forster, 1777				
Family CUTHONIDAE Odhner, 1934				
41. <i>Cuthona barbadiana</i> Edmunds & Just, 1983				

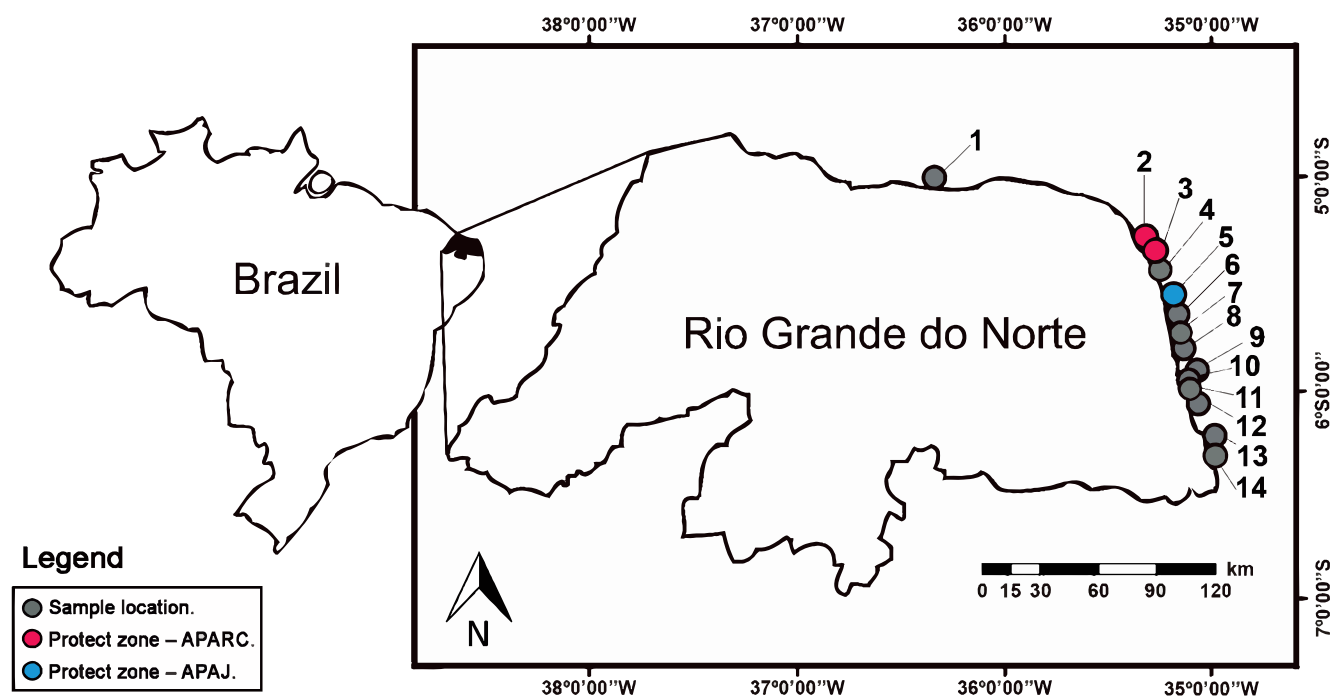


Figure 1. Sampling areas along the coast of Rio Grande do Norte state, northeastern Brazil.

beaches, rocky shores, and large coral reef formations. There are two remarkable protected zones, the first is Área de Proteção Ambiental dos Recifes de Corais – APARC, covering 1,360 km², including the reef formations of Rio do Fogo, Touros and Maracajaú beaches (Fig. 1), the second is Área de Proteção Ambiental de Jenipabu – APAJ, covering 18.8 km², characterized by large reef formation of ferruginous sandstone, where several natural pools are formed in the marine intertidal zones (IDEMA, 2010).

Overall, the knowledge on diversity of marine molluscs from Rio Grande do Norte is poor. A few malacological inventories were made in the recent past, among them works focused in Cephalopoda (Leite *et al.*, 2005); gastropods and bivalves (Andrade *et al.*, 2005a, b); and the last one conducted by Martinez *et al.* (2012) covering mollusks in general. Currently, only 14 heterobranch sea slugs are recorded from the coast of Rio Grande do Norte: *Aplysia dactylomela* Rang, 1828; *Atys sandersoni* Dall, 1881; *Berthella agassizi* (MacFarland, 1909); *Berthellina ignis* Alvim & Pimenta, 2015; *Bulla occidentalis* A. Adams, 1850; *Cerberilla potiguara* Padula & Delgado, 2010; *Crosslandia daedali* Poorman & Mulliner, 1981; *Cylindrobulla beuui* P. Fischer, 1857; *Felimare marci* (Ev. Marcus, 1971); *Felimida clenchi* (Russel, 1935); *Flabellina dana* Millen & Hamann, 2006; *Marionia limceana* Silva, Meirelles & Matthews-Cascon, 2013; *Micromelo undatus* (Bruguère, 1792) and *Thordisa diuda* Er. Marcus, 1955 (Er. Marcus & Ev. Marcus, 1970; Marcus, 1977; García *et al.*, 2008; Rios, 2009; Padula & Delgado, 2010; Lima & Delgado, 2011; Sales *et al.*, 2011; Silva *et al.*, 2013; Padula *et al.*, 2016).

In the present study, we aim to expand the knowledge of the diversity of sea slugs from Rio Grande do Norte, northeastern Brazil, through a taxonomic survey along the coast (Fig. 1). Color photographs of the species and new records are provided.

MATERIAL AND METHODS

Specimens were collected manually between July 2008 and November 2020 in 14 locations along the coast of Rio Grande do Norte (Fig. 1 and Appendix 1). Samplings were conducted from the intertidal region down to 18 m depth by free diving and scuba diving. In order to collect a greater diversity of species from different habitats, direct and indirect samplings were used to obtain material. Direct sampling was made in the field through visual observation of specimens under small rocks, reef fragments and on the macroalgae (*Caulerpa*, *Bryopsis* and *Sargassum* spp.), sponges, ascidians, hydrozoans and bryozoans. Indirect sampling was conducted by taking macroalgae to the laboratory. Macroalgae were placed in plastic bags with seawater, later transferred to white trays that were covered with a black cloth to block light. In this way, the absence of light on the environment facilitates the transit of sea slugs, allowing them move from the macroalgae to the trays making their collection easier. Collected specimens were measured and photographed with a digital camera Sony Cyber-Shot S730 attached to the ocular lens of a stereoscopic microscope Tecnival, model Sqf-F. The specimens were frozen in seawater, thawed and fixed with ethanol 70% or 99%. Taxonomic identification was based on external morphology following the specific literature such as original descriptions, checklists and field guides (Er. Marcus, 1955; Valdés *et al.*, 2006; Padula *et al.*, 2012; Galvão-Filho *et al.*, 2015, among others). Specimens were deposited in the malacological collections of Museu de Zoologia, Universidade de São Paulo (MZUSP); Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ); and Coleção de Invertebrados Aquáticos, Grupo de Estudos em Ecologia e Fisiologia de Animais Aquáticos (GEEFAA), Universidade Federal do Rio Grande do Norte (Appendix 2).

Sampling locations (Fig. 1)

- 1) Praia de Galinhos, Galinhos, RN (GLN) – 05°05'19"S, 36°16'31"W
- 2) Praia de Rio do Fogo, Rio do Fogo, RN (RFG)¹ – 05°14'48"S, 35°22'41"W
- 3) Parrachos de Maracajaú, Maxaranguape, RN (MRJ)² – 05°22'12"S, 35°18'23"W
- 4) Praia de Pitangui, Extremoz, RN (PTG) – 05°62'40"S, 35°21'58"W
- 5) Praia de Santa Rita, Extremoz, RN (STR)³ – 05°41'40"S, 35°11'57"W
- 6) Praia de Areia Preta, Natal, RN (ARP) – 05°47'35"S, 35°11'05"W
- 7) Praia de Ponta Negra, Natal, RN (PNG) – 05°86'77"S, 35°17'90"W
- 8) Praia de Cotovelo, Parnamirim, RN (CTV) – 05°57'53"S, 35°08'31"W
- 9) Cabeço de Barreirinhas, Nísia Floresta, RN (BRR) – 05°57'22"S, 35°02'20"W
- 10) Cabeço de Mestre Vicente, Nísia Floresta, RN (MTV) – 05°56'98"S, 35°02'22"W
- 11) Praia de Pirambúzios, Nísia Floresta, RN (PRB) – 06°00'06"S, 35°06'24"W
- 12) Praia de Tabatinga, Nísia Floresta, RN (TBT) – 06°03'30"S, 35°05'44"W
- 13) Praia de Pipa, Tibau do Sul, RN (PIP) – 06°13'37"S, 35°03'00"W
- 14) Praia de Bahia Formosa, Baía Formosa, RN (BFM) – 06°22'18"S, 34°59'30"W

RESULTS

A total of 41 species belonging to 32 genera and 18 families were identified. Among these, five species are new records from the South Atlantic Ocean, two are new records from northeastern Brazil, and a total of 36 species are new records from the coast of Rio Grande do Norte (Table 1).

Systematics

Class Gastropoda Cuvier, 1795

Subclass Heterobranchia Burmeister, 1837

Infraclass Euthyneura Spengel, 1881

**Subterclass Acteonimorpha Schrödl
in Bouchet et al., 2017**

Superfamily Acteonoidea d'Orbigny, 1842

Family Aplustridae Gray, 1847

Genus *Micromelo* Pilsbry, 1895

01. *Micromelo undatus* (Bruguère, 1792) (Fig. 2A)

Material examined: Parrachos de Rio do Fogo, Rio do Fogo, 25.VI.2009, two specimens, 14-15 mm (body

length), leg. M. Delgado (GEEFAA 294). Praia de Santa Rita, Extremoz, 11.X.2008, one specimen, 14 mm (body length), leg. M. Delgado (MZSP 97052), 09.VII.2009, one specimen, 13 mm (body length), leg. M. Delgado (GEEFAA 361a), 22.VIII.2009, one specimen, 18 mm (body length), leg. M. Delgado (GEEFAA 339). Praia de Pirambúzios, Nísia Floresta, 11.VII.2009, one specimen, 30 mm (body length), leg. M. Delgado (GEEFAA 275), 08.XII.2013, four specimens, 30-40 mm (body length), leg. M. Delgado (GEEFAA 320), 18.I.2014, two specimens, 20-30 mm (body length), leg. M. Delgado (GEEFAA 323). Praia de Tabatinga, Nísia Floresta, 01.IV.2014, one specimen, 20 mm (body length), leg. T. Accioli (GEEFAA 327), five specimens, 02.V.2015, 10-24 mm (body length), leg. M. Delgado (GEEFAA 1319); Praia de Pitangui, Extremoz, 27.XII.2019, one specimen, 22 mm (body length), phot. reg. M. Delgado.

Description: Body elongate, translucent grayish coloration, with large, white, opaque spots throughout the body. Edge of the mantle and lobes of the cephalic shield greenish, with whitish, yellowish and reddish tone at edges. Bilobed cephalic shield, with eyes mid-frontally. Shell present, whitish with reticulated reddish pattern. Posteriorly, mantle projection covering the shell. Flattened, oval foot with coloration similar to the body.

Geographic distribution: Atlantic Ocean: Ascension Island, Azores, Barbados, Bermuda, Bonaire, Canary Island, Cape Verde Island, Colombia, Costa Rica, Cuba, Curaçao, Haiti, Honduras, Jamaica, Martinique, Panama, Puerto Rico, St. Lucia, St. Vincent and the Grenadines, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Bahia, Ceará, Fernando de Noronha, Pernambuco and Rio Grande do Norte) (Nordsieck, 1972; García et al., 2002; Moro et al., 2003; Valdés, 2005; Valdés et al., 2006; Rios, 2009; Martínez et al., 2012; Padula et al., 2012; Galvão-Filho et al., 2015; Padula et al., 2017; Feliciano et al., 2021).

Subterclass Tectipleura Schrödl, Jörger, Klussmann-Kolb & Wilson, 2011

Order Cephalaspidea P. Fischer, 1883

Superfamily Haminoeidea Pilsbry, 1895

Family Haminoeidae Pilsbry, 1895

**Genus *Haminoea* Turton & Kingston
[in Carrington], 1830**

02. *Haminoea antillarum* (d'Orbigny, 1841) (Fig. 2B)

Material examined: Praia de Pirambúzios, Nísia Floresta, 12.IV.2010, one specimen, 2 mm (body length), leg. A. Pires (GEEFAA 344), 14.IV.2010, two specimens, 2-4 mm (body length), leg. A. Pires (GEEFAA 256a).

Description: Oblique body, predominantly translucent, light beige coloration. Shell transparent and, on the ventral side, with dark beige tone, dotted with several black circular spots. In the head, there is a one-piece cephalic shield that narrows towards the shell. On dorsal side of

1 Protected zone – Área de Proteção dos Recifes de Corais – APARC (Fig. 1 – red circle, Nº 2).

2 Protected zone – Área de Proteção dos Recifes de Corais – APARC (Fig. 1 – red circle, Nº 3).

3 Protected zone – Área de Proteção de Jenipabu – APAJ (Fig. 1 – blue circle)

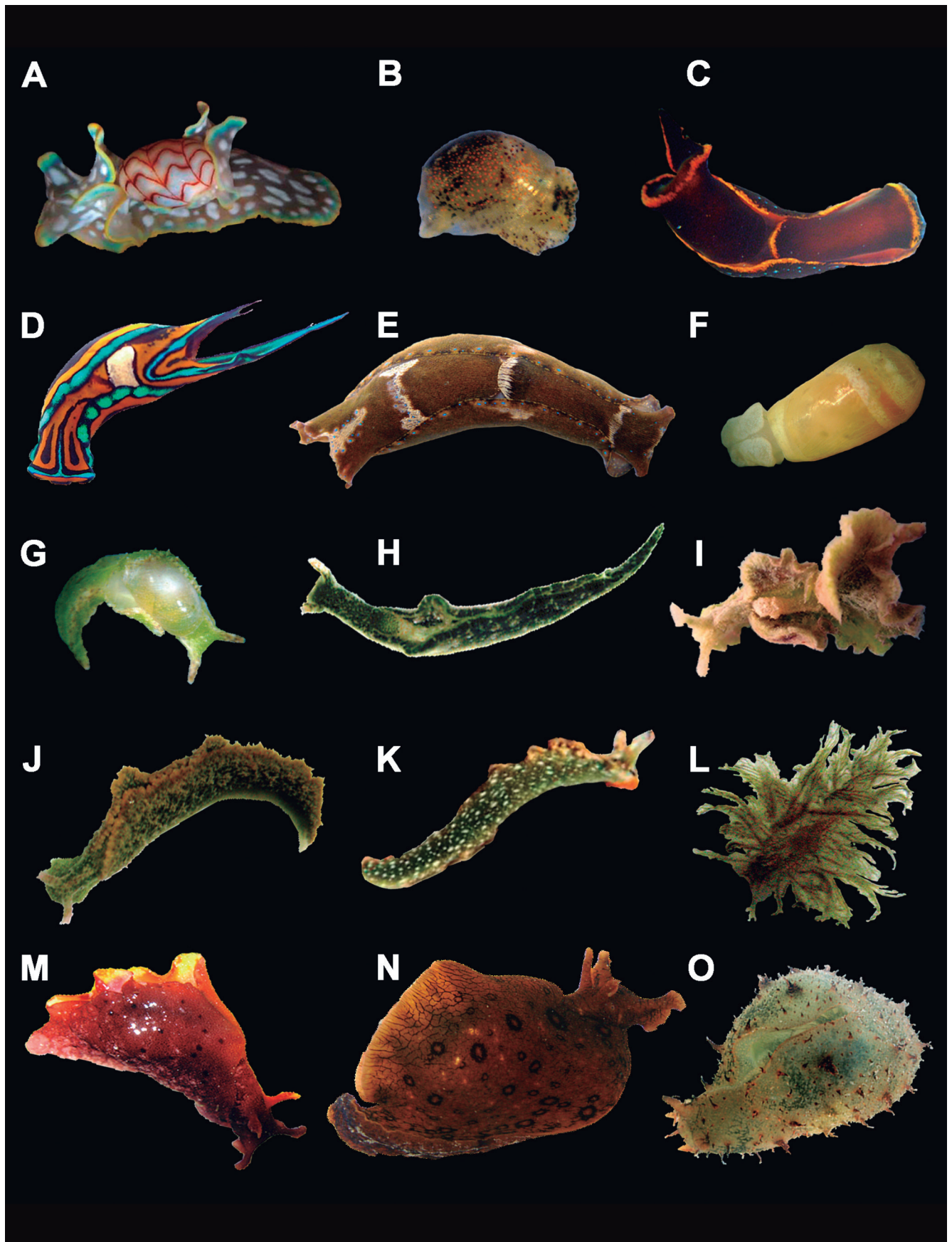


Figure 2. Heterobranch sea slugs from Rio Grande do Norte. (A) *Micromelo undatus* (15 mm – GEEFAA 294); (B) *Haminoea antillarum* (2 mm – GEEFAA 344); (C) *Camachoaglaja berolina* (7 mm – GEEFAA 270); (D) *Chelidonura hirundinina* (16 mm – GEEFAA 1320); (E) *Navanax gemmatus* (40 mm – MZSP 97068); (F) *Ascobulla ulla* (7 mm – MZSP 97049); (G) *Oxynoe antillarum* (25 mm – GEEFAA 352); (H) *Elysia canguzua* (15 mm – GEEFAA 295); (I) *Elysia pawliki* (25 mm – MZSP 97061); (J) *Elysia subornata* (14 mm – MZSP 97050); (K) *Thuridilla malaquita* (15 mm – phot. reg.); (L) *Caliphylia mediterranea* (9 mm – GEEFAA 349); (M) *Aplysia cervina* (70 mm – MZSP 97074); (N) *Aplysia dactylomela* (76 mm – MZSP 97073); (O) *Bursatella leachii* (75 mm – GEEFAA 324).

the shield there are black eyes very close together, similar to eyes of planarians. Slightly calcified shell, flattened at its apex and rounded at its base, with very wide cavity. The animal not able to retract completely into the shell.

Geographic distribution: Eastern Atlantic, (Rios, 2009; Rosenberg *et al.*, 2009), zoogeographic provinces: Mauritian, Senegalese and South-Eastern Atlantic (García & Bertsch, 2009); Western Atlantic: Bahamas, Belize, Bermudas, Bonaire, Cayman Island, Colombia, Costa Rica, Cuba, Curaçao, Granada, Guadeloupe, Honduras, Jamaica, Mexico, Panama, Puerto Rico, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Ceará, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, Rio Grande do Sul, São Paulo) (García *et al.*, 2008; Padula *et al.*, 2012; Zamora-Silva & Ortigosa, 2012).

Superfamily Philinoidea Gray, 1850
Family Aglajidae Pilsbry, 1895
Genus *Camachoaglaja* Zamora-Silva & Malaquias, 2017

03. *Camachoaglaja berolina*
(Er. Marcus & Ev. Marcus, 1970) (Fig. 2C)

Material examined: Parrachos de Maracajaú, Maxaranguape, 20.VI.2015, one specimen, 40 mm (body length), leg. T. Accioly (GEEFAA 1321); Praia de Pirambúzios, Nisia Floresta, 13.II.2014, one specimen, 7 mm (body length), leg. T. Accioly (GEEFAA 270), 13.III.2014, one specimen, 6 mm (body length), leg. T. Accioly (GEEFAA 260a), 03.IV.2014, one specimen, 10 mm (body length), leg. T. Accioly (GEEFAA 265a).

Description: Elongated and cylindrical body. Black background coloration with the edges of the parapodia, presence of circular and opaque spots in turquoise, distributed all over the body. Cephalic shield very robust and elongated with the presence of developed eyes and a pair of ciliary tufts on each side of the mouth. In the distal body, there are two lobes, the left one being well developed and pointed, forming a prominent tail.

Geographic distribution: Bahamas, Belize, Bermuda, Cayman Islands, Colombia, Cuba, Honduras, Jamaica, Martinique, Mexico, Panama, Puerto Rico, USA, Brazil (Bahia, Rio Grande do Norte – present study) (García *et al.*, 2008).

Remarks: Ornelas-Gatdula *et al.* (2011) performed a phylogenetic analysis on specimens of *Chelidonura* from the Caribbean region and concluded that variations of different species belong to *C. berolina*. In addition, their analyses revealed a new species, *C. normani*, endemic from the Bahamas, very similar to *C. berolina* but differentiated genetically and by the morphology of the posterior end of the foot, being longer and thinner in *C. berolina*. García *et al.* (2008) recorded *C. berolina* for the first time in the South Atlantic Ocean, based on material from Bahia,

northeastern Brazil. The present study confirms the presence of *C. berolina* from northeastern Brazil, being the first record from Rio Grande do Norte.

Genus *Chelidonura* A. Adams, 1850

04. *Chelidonura hirundinina*
(Quoy & Gaimard, 1833) (Fig. 2D)

Material examined: Parrachos de Rio do Fogo, Rio do Fogo, 20.VI.2015, two specimens, 14-16 mm (body length), leg. T. Accioly (GEEFAA 1320).

Description: Body yellowish-orange with a darker sub-margin. A blue mark on the head shield (T-shape), on the edge of the parapodium and on the tail (V-shape). On the dorsum, two small black droplet-shaped spots on the anterior portion and posterior to cephalic shield, large, white rectangle-shaped mark on posterior shield near tail and ventral portion completely darkened. Tail formed by two pointed projections, the left longer than the right.

Geographic distribution: Indo-Pacific: Australia, Japan, USA (Hawaii and Palmyra Atoll), Philippines, Indonesia and Madagascar (Valdés *et al.*, 2006). Western Atlantic: Aruba, Bahamas, Bonaire, Cayman Islands, Curaçao, Guadeloupe, Puerto Rico, USA (Florida), Venezuela and Brazil (Rio Grande do Norte – present study) (Valdés *et al.*, 2006; Camacho-García *et al.*, 2014; Zamora-Silva & Malaquias, 2017).

Remarks: Valdés *et al.* (2006) recorded a broad geographic range for *Chelidonura hirundinina* in the Indo-Pacific and tropical Western Atlantic. Camacho-García *et al.* (2014) presented a phylogenetic molecular study on the family Aglajidae (Pilsbry, 1895) showing genetic divergence between populations of *C. hirundinina* from the Indo-Pacific and the Western Atlantic. Zamora-Silva & Malaquias (2017) performed new molecular analyses, revising some specimens of *C. hirundinina* from the Indo-Pacific and Western Atlantic, promoting reclassification of some specimens. The authors emphasized that the genus *Chelidonura* is valid and although it is predominantly present in the Indo-Pacific Ocean, there are two species in the Western Atlantic Ocean, *C. cubana* Ortea & Martínez, 1997 and *C. hirundinina*. This is the first record of *C. hirundinina* from the South Atlantic Ocean.

Genus *Navanax* Pilsbry, 1895

05. *Navanax gemmatus* (Mörch, 1863) (Fig. 2E)

Material examined: Parrachos de Maracajaú, Maxaranguape, 17.V.2015, one specimen, 40 mm (body length), leg. M. Delgado (GEEFAA 1322); Praia de Santa Rita, Extremoz, 28.III.2009, one specimen, 40 mm (body length), leg. V. Padula (MZSP 97068), 24.VI.2009, one speci-

men, 28 mm (body length), leg. M. Delgado (GEEFAA 319). Praia de Pirambúzios, Nísia Floresta, 14.IV.2010, one specimen, 20 mm (body length), leg. G. Grimaldi (GEEFAA 300), 29.I.2014, one specimen, 45 mm (body length), leg. T. Accioly (GEEFAA 328), 15.V.2014, one specimen, 30 mm (body length), phot. reg. T. Accioly.

Description: Elongated and cylindrical body. Predominant body color greenish-brown, with numerous dorsal, thin longitudinal lines beige color. Cephalic shield well elongated and rounded at the anterior end, well-developed retractable eyes, a pair of lateral lobes and a well-developed mouth structure. Lateral parapodia covering 80% of the dorsum, leaving a small part exposed. In the posterior region, terminal lobes divided into two semicircular flaps, forming a robust tail.

Geographic distribution: Western Atlantic: Antigua & Barbuda, Aruba Bahamas, Barbados, Belize, Bonaire, Chile, Colombia, Costa Rica, Curaçao, Grenada, Guadeloupe, Honduras, Jamaica, Martinique, Mexico, St. Barthelemy/ St. Bartholomew, St. Vicent & the Grenadines, USA, Venezuela, Virgin Islands, Brazil (Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Valdés *et al.*, 2006; García *et al.*, 2008; Rios, 2009; Ornelas-Gatdula *et al.*, 2012).

Remarks: Our specimens were initially identified as *Navanax aenigmaticus* Bergh, 1893, however Ornelas-Gatdula *et al.* (2012) performed a phylogenetic analysis where they revealed a complex of three species under the name *N. aenigmaticus*. This species complex showed genetic and morphological differences between specimens from the eastern Pacific, western and eastern Atlantic. The species present in the western Atlantic is *N. gemmatus*.

Superorder Sacoglossa Ihering, 1876
Superfamily Oxynooidea Stoliczka, 1868
Family Volvatellidae Pilsbry, 1895
Genus *Ascobulla* Ev. Marcus, 1972

06. *Ascobulla ulla*
(Ev. Marcus & Er. Marcus, 1970) (Fig. 2F)

Material examined: Praia de Santa Rita, Extremoz, 24.VI.2009, six specimens, 2-7 mm (body length), leg. M. Delgado (MZSP 97049).

Description: Cylindrical external shell, translucent and slightly calcified with flat apex. Head with a cephalic shield with two lobes divided by a deep groove. Visceral mass visible through the shell, varying from light brown to orange. Cephalic shield translucent with numerous small white dots on its surface.

Geographic distribution: Western Atlantic: Aruba, Bahamas, Belize, Bermuda, Bonaire, Cayman Islands, Costa Rica, Curaçao, Guadeloupe, Mexico, Turks & Caicos,

USA, Venezuela, Virgin Islands, Brazil (Abrolhos, Ceará, Espírito Santo, Pernambuco, Rio Grande do Norte – present study, São Paulo) (Marcus & Marcus, 1970; Mikkelsen, 1998; Rios, 2009; Galvão-Filho *et al.*, 2015).

Family Oxynoidea Stoliczka, 1868
Genus *Oxynoe* Rafinesque, 1814

07. *Oxynoe antillarum* Mörch, 1863 (Fig. 2G)

Material examined: Praia de Santa Rita, Extremoz, 24.VI.2009, six specimens, 4-20 mm (body length), leg. F. Santos (MZSP 97055) and leg. M. Delgado (GEEFAA 276), 09.VII.2009, six specimens, 6-15 mm (body length), leg. M. Delgado (GEEFAA 312), 22.VIII.2009, six specimens, 3-7 mm (body length), leg. M. Delgado (GEEFAA 279). Praia de Cotovelo, Parnamirim, 29.IX.2009, five specimens, 4-6 mm (body length), leg. M. Delgado (GEEFAA 281). Praia de Pirambúzios, Nísia Floresta, 12.III.2009, twenty specimens, 1-5 mm (body length), leg. V. Padula (MZSP 97043), 21.VI.2009, five specimens, 2-5 mm (body length), phot. reg. M. Delgado, 21.VII.2009, seven specimens, 4-12 mm (body length), leg. M. Delgado (GEEFAA 277), 13.II.2010, 1-10 mm (body length), leg. M. Delgado (GEEFAA 278, 292), 28.II.2010, 1-11 mm (body length), leg. M. Delgado (GEEFAA 307), 07.IV.2011, thirty-eight specimens, 2-10 mm (body length), leg. M. Delgado (GEEFAA 296), 27.IV.2013, sixty-eight specimens, 1-13 mm (body length), phot. reg. M. Delgado. Praia de Baía Formosa, Baía Formosa, 04.I.2011, three specimens, 2-17 mm (body length), leg. F. Santos (GEEFAA 331), 13.V.2014, two specimens, 15-25 mm (body length), leg. M. Delgado (GEEFAA 352), 14.V.2014, three specimens, 4-7 mm (body length), leg. M. Delgado (GEEFAA 353).

Description: Elongate and cylindrical body, external bubble-shaped shell, translucent, fragile and covered by the parapodia, which forms a long tail on the posterior. Head with cylindrical rhinophores projected to the front of animal, evident black eyes at base of the head. Predominant color of the body green with some light blue spots and white at mantle edge and rhinophores top. Live specimens measuring about 1-19 mm body length.

Geographic distribution: Western Atlantic: Aruba, Bahamas, Barbados, Belize, Bermuda, Bonaire, Cayman Islands, Costa Rica, Cuba, Curaçao, Dominican Republic, Grenada, Guadeloupe, Honduras, Jamaica, Martinique, Mexico, Panama, Puerto Rico, St. Lucia, St. Thomas, St. Vicent & the Grenadines, Trinidad & Tobago, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Bahia, Ceará, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Rios, 1994; Padula, 2008; Rios, 2009; Meirelles *et al.*, 2010; Padula *et al.*, 2012; Galvão-Filho *et al.*, 2015).

Remarks: *Oxynoe antillarum* was often found associated to *Caulerpa racemosa*.

Superfamily Plakobranchoidea Gray, 1840
Family Plakobranchidae Gray, 1840
Genus *Elysia* Risso, 1818

08. *Elysia canguzua* Er. Marcus, 1955 (Fig. 2H)

Material examined: Praia de Pirambúzios, Nísia Floresta, 07.IV.2011, 41 specimens, 2-15 mm (body length), leg. M. Delgado (GEEFAA 295). Praia de Baía Formosa, Baía Formosa, 13.IV.2014, two specimens, 4-5 mm (body length), leg. M. Delgado (GEEFAA 297).

Description: Elongated and cylindrical body, up to 15 mm in length in live specimens. Translucent white background coloration, with large moss-green spots that run along the body. Elongated head, with small, depigmented eyes posterior to rhinophores that are elongated and curled prostrate towards the front of the animal, presenting a longitudinal groove towards the sides. Parapodia elongated and inserted posteriorly to the head, forming two lateral flaps in the medial portion, following a projection of a long tail along with the foot.

Geographic distribution: Western Atlantic: Costa Rica, Jamaica, Grenada, Martinique, Mexico, Panama, St. Vincent & the Grenadines, USA, Brazil (Ceará, Rio Grande do Norte – present study, São Paulo) (Marcus, 1955; Rios, 2009; Galvão-Filho *et al.*, 2015).

09. *Elysia pawliki* Krug, Vendetti & Valdés, 2016 (Fig. 2I)

Material examined: Praia de Pirambúzios, Nísia Floresta, 12.III.2009, one specimen, 25 mm (body length), leg. V. Padula (MZSP 97061 as *Elysia papillosa*). Praia de Baía Formosa, Baía Formosa, 04.I.2011, one specimen, 25 mm (body length), leg. M. Delgado (GEEFAA 318).

Description: Elongated and shapeless body. Olive-green background coloration, rhinophores, head and parapodia with a light beige coloration and brown small dots. Head conspicuous, with small black eyes. Rhinophores elongated and curled, prostrate towards the anterior side, with several tubercles from the base to the apex, leaving this covered with a curly texture.

Geographic distribution: Western Atlantic: Bahamas, Costa Rica, Venezuela, Brazil (Alagoas, as *Elysia subornata*; Rio Grande do Norte – present study) (Espinosa & Ortea, 2001; Redfern, 2001, Valdés *et al.*, 2006; Padula *et al.*, 2012; Redfern, 2013; Krug *et al.*, 2016).

10. *Elysia subornata* A.E. Verril, 1901 (Fig. 2J)

Material examined: Praia de Pirambúzios, Nísia Floresta, 21.VI.2009, one specimen, 14 mm (body length), leg. V. Padula (MZSP 97050), 13.II.2010, five specimens, 1-3 mm (body length), leg. M. Delgado (GEEFAA 310), 28.II.2010, two specimens, 4 mm (body length), phot. reg. M. Delgado; 14.IV.2010, three specimens, 7-10 mm (body length), leg. M. Delgado (GEEFAA 264a). 07.IV.2011,

two specimens, 8-19 mm (body length), leg. M. Delgado (GEEFAA 282). 05.I.2012, one specimen (lost), 8 mm (body length). 27.IV.2013, five specimens, 2-10 mm (body length), phot. reg. M. Delgado.

Description: Elongated and cylindrical body. Background color light green, speckled with black dots all over the body. Head prominent with black eyes at the base of the rhinophores, which is oblique, elongated and curled. Rhinophores prostrate to the sides, with a groove on the anterior side between them. From the base to the apex lined with small light beige tubercles. On the back there is a visible and voluminous pericardium with tubercles over it.

Geographic distribution: Eastern Atlantic: Canary Islands, Cape Verde, Madeira, Savage Islands. Western Atlantic: Aruba, Bahamas, Barbados, Belize, Bermuda, Bonaire, Cayman Islands, Costa Rica, Curaçao, Guadeloupe, Jamaica, Martinique, Mexico, Puerto Rico, St. Martin/St. Maarten, St. Vincent & the Grenadines, St. Thomas, Trinidad & Tobago, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Ceará, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Marcus, 1957, as *E. cauze*; Padula, 2008; Galvão-Filho *et al.*, 2015).

Genus *Thuridilla* Bergh, 1872

11. *Thuridilla malaquita* Ortea & Buske, 2014 (Fig. 2K)

Material examined: Parrachos de Maracajaú, Maxaranguape, 23.IV.2015, one specimen, 15 mm (body length), phot. reg. T. Accioly.

Description: Elongated and cylindrical body. Background color grayish-green in the anterior region and moss-green in the posterior region up to the tail, marked with numerous yellow rounded tubercles, present on both sides of the body. Head very evident, with black eyes at the base of the rhinophores, which are oblique, tightly curled and elongated. Oral region vivid orange. In the medial to the posterior portion, parapodia present with thick, broad and irregularly wavy margins that maintain the pattern of undulations up to the tip of the foot. Both parapodia with cream-white margin and, when closed, they cover a third of the pericardium near the head region. Pericardium voluminous with the same cream color of the entire back of the animal.

Geographic distribution: Western Atlantic: Colombia, Costa Rica, Grenada, Martinique (as *Thuridilla* sp.), Venezuela and Brazil (Rio Grande do Norte – present study) (Valdés *et al.*, 2006; Camacho-García *et al.*, 2014; Ortea & Buske, 2014).

Remarks: Martín-Hervás *et al.* (2021) confirmed the occurrence of the genus *Thuridilla* in the Atlantic Ocean. The specimen recorded agreed to the ones of *Thuridilla* sp. illustrated by Valdés *et al.* (2006), a species later described as *T. malaquita* by Ortea & Buske (2014). This is the first

record of the genus *Thuridilla* from Brazil and the first record of *T. malaquita* from the South Atlantic Ocean.

Family Hermaeidae H. Adams & A. Adams, 1854

Genus *Caliphylla* A. Costa, 1867

Type species: *Caliphylla mediterranea* A. Costa, 1867

12. *Caliphylla mediterranea* A. Costa, 1867 (Fig. 2L)

Material examined: Praia de Pirambúzios, Nísia Floresta, 05.I.2012, three specimens, 5-9 mm (body length), leg. M. Delgado (GEEFAA 349).

Description: Elongated and cylindrical body. Translucent greenish color, with small black dots and whitish spots all over the body. Head prominent; however, it can be confused dorsal branches, with black eyes medial and posterior to the rhinophores, which are long, bifurcated and curled, presenting the sulcus with the ventral portion. Posterior foot long. Presence of flattened cerata in the shape of leaves of different sizes due to the ramifications of the digestive gland as branching veins, the largest being more dorsal and the least more lateral.

Geographic distribution: Mediterranean Sea: Italy, Spain (Cervera *et al.*, 2004); Eastern Atlantic: Canary Islands, Savage Islands, Senegal (Marcus, 1977; Cervera *et al.*, 2004); Central South Atlantic: Ascension (Padula *et al.*, 2014). Western Atlantic: USA, Mexico, Costa Rica, Virgin Islands, Curaçao, Trinidad & Tobago, Brazil (Alagoas, Pernambuco, Fernando de Noronha, Rio Grande do Norte – present study, São Paulo) (Valdés *et al.*, 2006; García *et al.*, 2008; Rosenberg *et al.*, 2009; Padula *et al.*, 2012; Galvão-Filho *et al.*, 2015; Xavier *et al.*, 2017).

Remarks: Alves *et al.* (2022) described *Caliphylla yemanjae* Alves, Lima, Johnsson & Neves 2022 from Bahia, northeastern Brazil, which according to the authors can be differentiated from *C. mediterranea* in the color of dorsal region, shape and size of cerata, and length and shape of posterior foot. The specimens herein studied present characteristics of both *C. mediterranea* and *C. yemanjae*, thus were provisionally identified as *C. mediterranea*. Alves *et al.* (2022) mentioned that *Caliphylla yemanjae* is only known from its type-locality. The confirmation of the identity of specimens from other regions of the western Atlantic waits a revisionary work.

Order Aplysiida

Superfamily Aplysioidea Lamarck, 1809

Family Aplysiidae Lamarck, 1809

Genus *Aplysia* Linnaeus, 1767

13. *Aplysia cervina* (Dall & Simpson, 1901) (Fig. 2M)

Material examined: Praia de Santa Rita, Extremoz, 11.III.2009, four specimens, 30-70 mm (body length), leg. V. Padula (MZSP 97074; GEEFAA 305 and 308), 04.I.2014,

one specimen, 29 mm (body length), leg. M. Delgado (GEEFAA 322). Praia de Pirambúzios, Nísia Floresta, 07.IV.2011, one specimen, 30 mm (body length), leg. M. Delgado (GEEFAA 321); 01.III.2015, one specimen, 26 mm (body length), phot. reg. M. Delgado. Praia de Pitangui, Extremoz, 27.XII.2019, one specimen, 80 mm (body length), phot. reg. M. Delgado.

Description: Elongated and bulging body, size up to 100 mm in length. Color predominantly reddish-brown, dotted with circular and opaque black spots and shapeless white spots which cover the side and the entire internal region of the parapodia. Head with black eyes and elongated, cylindrical-retractable rhinophores, a veil formed by the fusion of the cephalic tentacles. Parapodia located in the medial region, between them there is a mantle that covers the inner shell filled with the visceral mass, descending to the substrate plane, forming a small tail together with the muscular foot.

Geographic distribution: Western Atlantic: Aruba, Barbados, Bonaire, Colombia, Cuba, Curaçao, Mexico, Puerto Rico, St. Lucia, USA, Venezuela, Brazil (Alagoas, Ceará, Pernambuco, Rio Grande do Norte – present study, São Paulo) (MacFarland, 1909; Er. Marcus, 1957; Rios, 1994; Rios, 2009; Padula *et al.*, 2012; Galvão-Filho *et al.*, 2015).

14. *Aplysia dactylomela* Rang, 1928 (Fig. 2N)

Material examined: Praia de Santa Rita, Extremoz, 26.IV.2009, one specimen, 76 mm (body length), leg. M. Delgado (MZSP 97073), 05.I.2011, one specimen, 15 mm (body length), leg. M. Delgado (GEEFAA 286). Praia de Cotovelo, Parnamirim, 01.II.2014, one specimen, 30 mm (body length), leg. M. Delgado (GEEFAA 350). Praia de Pirambúzios, Nísia Floresta, 13.II.2014, forty-five specimens, 80-280 mm (body length), phot. reg. M. Delgado. Praia de Tabatinga, Nísia Floresta, 15.II.2014, sixty specimens, 90-250 mm (body length), phot. reg. M. Delgado. Praia de Pipa, Tibau do Sul, 15.V.2014, eight specimens, 100-300 mm (body length), phot. reg. M. Delgado. Praia do Amor-Pipa, Tibau do Sul, 16.V.2014, seven specimens, 120-270 mm (body length), phot. reg. M. Delgado. Praia de Baía Formosa, Baía Formosa, 14.V.2014, fifteen specimens, 120-220 mm (body length), phot. reg. M. Delgado. Praia de Pitangui, Extremoz, 18.I.2019, one specimen, 80 mm (body length), leg. M. Delgado (GEEFAA 1317), 27.XII.2019, one specimen, 210 mm (body length), phot. reg. M. Delgado.

Description: Elongated and rounded body, up to 130 mm in length. Color predominantly dark yellow, dotted with circular spots, varying sizes and shapes of black rings and a complex of thin lines on the sides of the parapodia. Head with prominent black eyes, cylindrical, retractable and elongated rhinophores with the apex in the form of an open leaf, a veil that is formed by the fusion of the cephalic tentacles. Parapodia located in the medial region and descending to the substrate plane, forming a small tail together with the muscular foot.

Geographic distribution: Mediterranean Sea: Croatia, Cyprus, Greece, Israel, Italy, Lebanon, Malta, Montenegro, Turkey (Valdés *et al.*, 2013); Eastern Atlantic: Ascension Island, Canary Islands, Madeira, Savage Islands (Cervera *et al.*, 2004; Padula *et al.*, 2014); Western Atlantic: Anguilla, Aruba, Bahamas, Belize, Bermuda, Bonaire, Cayman Islands, Colombia, Costa Rica, Cuba, Curaçao, Dominican Republic, Grenada, Guadeloupe, Honduras, Jamaica, Martinique, Mexico, Panama, Puerto Rico, St. Kitts/St. Christopher, St. Lucia, St. Martin/St. Maarten, St. Vincent & the Grenadines, Trinidad & Tobago, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Bahia, Ceará, Pernambuco, Rio de Janeiro, Rio Grande do Norte, São Paulo, Santa Catarina) (MacFarland, 1909; Rios, 1994; Bezerra *et al.*, 2006; Rios, 2009; Ourives *et al.*, 2011; Martinez *et al.*, 2012; Padula *et al.*, 2012; Ferreira-Jr. *et al.*, 2015; Galvão-Filho *et al.*, 2015).

Remarks: Until recently, *A. dactylomela* was considered a circumtropical species. Alexander & Valdés (2013) performed an integrative study and concluded that the Indo-Pacific specimens belong to *Aplysia argus* Rüppell & Leuckart, 1830. *Aplysia dactylomela* thus occurs in the Atlantic Ocean and Mediterranean Sea. Rios (1994) recorded *A. dactylomela* from the coast of Rio Grande do Norte as a result of the work of the German couple Ernst Marcus & Eveline Marcus in the 1960s. Years later, Martinez *et al.* (2012) recorded the species in the Parrachos of Maracajaú, as a result of a research on the macrobenthic community. The present work confirms the occurrence of *A. dactylomela* along the entire coast of Rio Grande do Norte.

Genus *Bursatella* Blainville, 1817

15. *Bursatella leachii* Blainville, 1817 (Fig. 20)

Material examined: Praia de Galinhos, Galinhos, 21.IX.2008, one specimen, 75 mm (body length), leg. M. Delgado (GEEFAA 324).

Description: Body oval to elongate, wider towards the posterior end and shell absent. Living specimens measuring up to 100 mm in length. Dorsum covered by numerous long and ramified papillae (fuzzy appearance). Head with two rhinophores on the dorsal side and oral tentacles in either side of the mouth. Body color light green with some lighter brown spots. Gill on the dorsal side covered by two short parapodial flaps.

Geographic distribution: Widespread in the Indo-Pacific region except from the Hawaiian Islands and the Eastern Pacific (Bazzicalupo *et al.*, 2020); Mediterranean Sea: Spain-Balearic Islands (Cervera *et al.*, 2004); Western Atlantic: Aruba, Bermuda, Bonaire, Colombia, Costa Rica, Cuba, Curaçao, Guadeloupe, Jamaica, Mexico, Panama, Puerto Rico, Trinidad & Tobago, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Ceará, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, Rio

Grande do Sul, São Paulo) (Er. Marcus, 1955; Ev. Marcus, 1972; Rios, 2009; Padula *et al.*, 2012; Ferreira-Jr. *et al.*, 2015; Galvão-Filho *et al.*, 2015; Bazzicalupo *et al.*, 2020).

Remarks: Recent integrative study by Bazzicalupo *et al.* (2020) confirmed the widespread geographic distribution of *B. leachii* in the Atlantic Ocean, Mediterranean Sea and Indo-Pacific region.

Genus *Phyllaplysia* P. Fischer 1872

16. *Phyllaplysia engeli* Er. Marcus, 1955 (Fig. 3A)

Material examined: Praia de Santa Rita, Extremoz, 04.IV.2014, three specimens, 5–6 mm (body length), leg. M. Delgado (GEEFAA 342). Praia de Pirambúzios, Nísia Floresta, 12.III.2009, one specimen, 15 mm (body length), leg. J. Bahia (GEEFAA 347). Praia de Pirambúzios (mangrove), 13.III.2009, one specimen, 2 mm (body length), leg. V. Padula (MZSP 97036 as *Dolabella* sp.), 28.II.2010, one specimen, 6 mm (body length), phot. reg. M. Delgado, 12.IV.2010, three specimens, 2–8 mm (body length), leg. M. Delgado (GEEFAA 346). Praia de Baía Formosa, Baía Formosa, 13.V.2014, two specimens, 5–6 mm (body length), leg. M. Delgado (GEEFAA 351). Praia de Pitangui, Extremoz, 05.III.2019, one specimen, 10 mm (body length), leg. M. Delgado (GEEFAA 1318).

Description: Body oval and flattened smooth or with low tubercles and papillae. Living specimens measuring about 5–26 mm in length. Head with cylindrical oblique rhinophores and cephalic tentacles projected to the front of animal. Specimens's color varies from yellow to light brown.

Geographic distribution: Western Atlantic: Aruba, Bahamas, Barbados, Bonaire, Colombia, Costa Rica, Cuba, Curaçao, Guadeloupe, Jamaica, Mexico, Puerto Rico, St. Martín/St. Maarten, USA, Venezuela, Brazil (Ceará, Espírito Santo, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Er. Marcus, 1955; Ev. Marcus, 1972; García *et al.*, 2008; Galvão-Filho *et al.*, 2015).

Subterclass Ringipleura Kano, Brenzinger, Nützel, Wilson & Schrödl, 2016

Superorder Nudipleura Wägele & Willan, 2000

Order Pleurobranchomorpha Pelseneer, 1906

Superfamily Pleurobranchoidea Gray, 1827

Family Pleurobranchidae Gray, 1827

Genus *Berthella* Blainville, 1824

17. *Berthella agassizi* (MacFarland, 1909) (Fig. 3B)

Material examined: Praia de Santa Rita, Extremoz, 11.III.2009, one specimen, 11 mm (body length), leg. V. Padula (MZSP 97047). Praia de Pirambúzios (mangrove), Nísia Floresta, 13.III.2009, two specimens, 6–9 mm (body length), leg. V. Padula (MZSP 97066; GEEFAA 269).

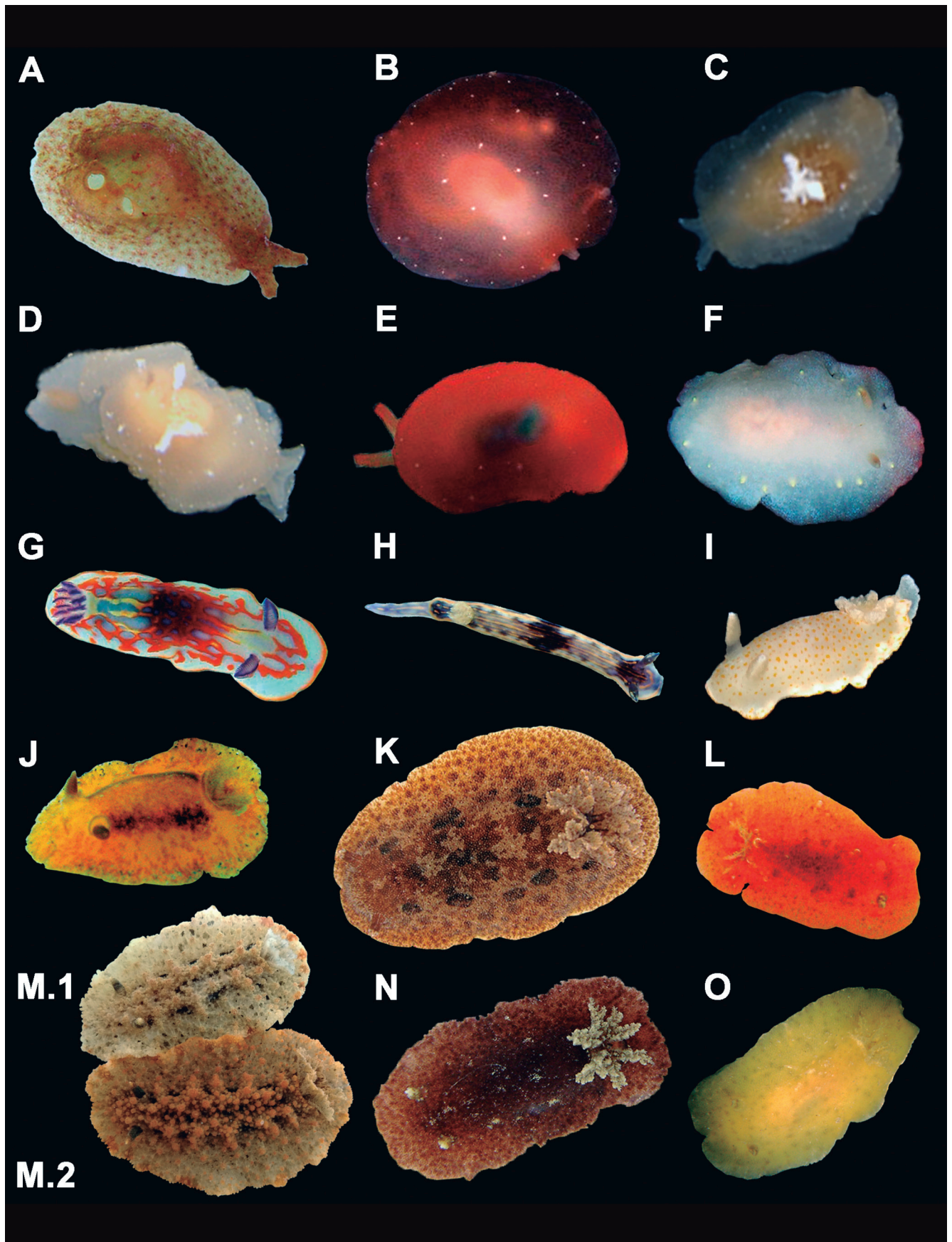


Figure 3. Heterobranch sea slugs from Rio Grande do Norte. (A) *Phyllaplysia engeli* (6 mm – GEEFAA 342); (B) *Berthella agassizii* (11 mm – MZSP 97047); (C) *Berthella nebula* (7 mm – GEEFAA 1307); (D) *Berthella vialactea* (14 mm – GEEFAA 304); (E) *Berthellina ignis* (10 mm – GEEFAA 335); (F) *Cadlina rumia* (10 mm – GEEFAA 311); (G) *Felimida clenchi* (9 mm – MZSP 97070); (H) *Felimare* sp. (13 mm – GEEFAA 313); (I) *Tyrinna evelinae* (18 mm – GEEFAA 1305); (J) *Diaulula greeleyi* (20 mm – GEEFAA 259a); (K) *Discodoris branneri* (70 mm – MZSP 97063); (L) *Geitodoris pusae* (14 mm – GEEFAA 338); (M.1) *Sclerodoris prea* (33 mm – GEEFAA 1314); (M.2) *Sclerodoris prea* (35 mm – GEEFAA 1314); (N) *Taringa iemanja* (25 mm – MZSP 97062); (O) *Taringa telopia* (18 mm – MZSP 97071).

Praia de Baía Formosa, Baía Formosa, 04.VI.2009, two specimens, 13-15 mm (body length), leg. M. Delgado (MZSP 97067; GEEFAA 333); Praia de Pitangui, Extremoz, 20.I.2019, one specimen, 10 mm (body length), leg. M. Delgado (GEEFAA 1309).

Description: Oval body, up to 25 mm in length. Pink-brownish coloration with numerous white spots on the oval-shaped notum. Whitish-grayish coloration mid-dorsally due to visceral mass under the internal shell. Presence of a sub-trapezoidal veil, one pair of retractile, lobulated rhinophores. Gills in the right side of the body. Muscular foot projected posteriorly, but covered by the notum.

Geographic distribution: Eastern Pacific: Mexico (Gosliner & Bertsch, 1988); Western Atlantic: Bahamas, Belize, Bermuda, Colombia, Curaçao, Brazil (Alagoas, Espírito Santo, Pernambuco, Rio de Janeiro, Rio Grande do Norte, São Paulo and Santa Catarina) (MacFarland, 1909; García *et al.*, 2008; Padula *et al.*, 2012; Alvim & Pimenta, 2015).

18. *Berthella nebula* Ghanimi, Schrödl, Goddard, Ballesteros, Gosliner & Valdés, 2020 (Fig. 3C)

Material examined: Praia de Santa Rita, Extremoz, 26.IV.2009, one specimen, 10 mm (body length), leg. M. Delgado (GEEFAA 273), 04.I.2014, one specimen, 5 mm (body length), leg. M. Delgado (GEEFAA 343). Praia de Pitangui, Extremoz, 12.I.2019, one specimen, 7 mm (body length), leg. M. Delgado (GEEFAA 1307), 20.I.2019, one specimen, 8 mm (body length), leg. M. Delgado (GEEFAA 1308).

Description: Elongate oval body, 5-10 mm body length. Mantle broad and smooth covering the foot. Dorsum translucent white or grayish, with numerous small white opaque spots and irregular edges. In the middle of the notum there is one transversal, white, opaque bar with variably shaped pattern resembling a "T", "Y" or "√" symbol. Large oral veil, trapezoidal, translucent-white with some small white or grayish opaque spots on near anterior and side margins. One pair of retractile, lobulated, arcuated rhinophores. Mid-dorsal area covered by the smooth notum, light brown coloration, protected by the inner shell. Gills on right side of the body, located between the inferior part of the mantle and the superior part of the foot. Inner shell, oval, covering part of body, translucent light brown or honey-colored.

Geographic distribution: Western Atlantic: Martinique, Jamaica, Caribbean coast of Mexico, Puerto Rico, Caribbean coast of Panama, Brazil (Rio Grande do Norte – present study) (Marcus & Marcus, 1970; Gosliner & Bertsch, 1988; Ghanimi *et al.*, 2020).

Remarks: Specimens found were initially identified as *Berthella stellata* (Risso, 1826), a previously circumtropical species (Valdés *et al.*, 2006). Alvim & Pimenta (2015)

presented a discussion on morphological differences of Brazilian specimens of *B. stellata* when compared to specimens from other regions. Despite of the differences, they maintained the name *B. stellata* for the morphotypes of the Brazilian coast. Ghanimi *et al.* (2020) conducted molecular phylogenetic analyses to better understand the taxonomy of the *B. stellata* species complex based on specimens collected in different oceans. These authors concluded that *B. stellata* did not occur in the Western Atlantic. In fact, western Atlantic '*B. stellata*' corresponded to two species: *Berthella nebula* and *Berthella vialactea* Ghanimi, Schrödl, Goddard, Ballesteros, Gosliner & Valdés, 2020. Both were herein recorded from Rio Grande do Norte.

19. *Berthella vialactea* Ghanimi, Schrödl, Goddard, Ballesteros, Gosliner & Valdés, 2020 (Fig. 3D)

Material examined: Praia de Pirambúzios, Nísia Floresta, 13.II.2010, one specimen (lost), 8 mm (body length). Praia de Baía Formosa, Baía Formosa, 05.VII.2009, two specimens, 10-14 mm (body length), leg. M. Delgado (MZSP 97065; GEEFAA 304).

Description: Elongate oval body, 8-14 mm body length. Mantle broad and smooth covering the foot. Dorsum translucent white or milk white, with numerous small white opaque spots. Near the center of the dorsum there is one transversal, white, opaque bar with variably shaped pattern resembling a "T", "Y" or irregular shaped. Large oral veil, trapezoidal, translucent-white with some small white opaque spots. Retractable rhinophores emerging between mantle and oral veil, rolled and arcuated. Mid-dorsally covered by the smooth notum, whitish coloration, protected by the inner shell. Gills on right side of the body and located between the inferior part of the mantle and the superior part of the foot. Inner shell oval, convex, covering part of body and translucent white.

Geographic distribution: Western Atlantic: Martinique (Ghanimi *et al.*, 2020) and Brazil (Rio Grande do Norte – present study).

Remarks: Similar in color and shape to *Berthella nebula* but with translucent shell (Ghanimi *et al.*, 2020).

Genus *Berthellina* Gardiner, 1936

20. *Berthellina ignis* Alvim & Pimenta, 2015 (Fig. 3E)

Material examined: Cabeço de Barreirinhas, Nísia Floresta, 10.III.2009, six specimens, 4-10 mm (body length), leg. V. Padula (MZSP 97042), 20.VI.2009, one specimen, 25 mm (body length), leg. M. Delgado (MZSP 97039); Cabeço de Mestre Vicente, Nísia Floresta, 10.XII.2009, one specimen, 5 mm (body length), leg. M. Delgado (GEEFAA 335).

Description: Body oval, 4 to 25 mm in length, orange reddish coloration with a few white spots. Anteriorly, with (1) a subtrapezoidal veil with undulated anterior margin; (2) a pair of retractile, v-shaped, lobulated and conspicuous rhinophores. Mid-distally, body covered by the notum, which shows minute papillae. Center of the body darkened by the visceral mass, protected by the internal shell. Gills on right side of the body, located between the inferior part of the mantle and the superior part of the foot. Ventrally, muscular foot flattened and completely covered by the notum.

Geographic distribution: Western Atlantic: Brazil (Pará and Rio Grande do Norte) (Alvim & Pimenta, 2015).

Remarks: The species was described by Alvim & Pimenta (2015) based on specimens from Ceará, northern Brazil and specimens from Rio Grande do Norte (Cabeço de Barreirinhas dive site). In the present study, we recorded the species at Cabeço de Mestre Vicente dive site.

Order Nudibranchia Cuvier, 1817

Suborder Doridina Odhner, 1934

Superfamily Chromodoridoidea Bergh, 1891

Family Cadlinidae Bergh, 1891

Genus *Cadlina* Bergh, 1879

21. *Cadlina rumia* Er. Marcus, 1955 (Fig. 3F)

Material examined: Praia de Pirambúzios (mangrove), Nísia Floresta, 13.III.2009, one specimen, 12 mm (body length), leg. V. Padula (MZSP 97064). Praia de Baía Formosa, Baía Formosa, 04.VII.2009, one specimen, 10 mm (body length), leg. F. Santos (GEEFAA 311).

Description: Body flattened, elliptical, 13 mm in length. Coloration white with yellow glands at the border of the mantle. Rhinophores with white basis graduating to brown in the apical portion. Anteriorly with a projecting notum, which covers the foot; and a pair of retractile, lamellate rhinophores; eyes close to the proximal part of the rhinophores. Mid-dorsally with a ring of glands around the notum. Posteriorly, five flattened, retractile gill leaves around the anus.

Geographic distribution: Eastern Atlantic: Ghana (Edmunds, 1981); Western Atlantic: Aruba, Bahamas, Belize, Bonaire, Cuba, Curaçao, Dominican Republic, Grenada, Guadeloupe, Jamaica, Panama, Puerto Rico, St. Lucia, St. Martín/St. Maarten, Saint Vicent & the Grenadines, USA, Venezuela, Brazil (Alagoas, Bahia, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Marcus, 1955; Domínguez *et al.*, 2006; Valdés *et al.*, 2006; García *et al.*, 2008; Ourives *et al.*, 2011; Padula *et al.*, 2012; Sales *et al.*, 2013).

Family Chromodorididae Bergh, 1891

Genus *Felimida* Ev. Marcus, 1971

22. *Felimida clenchi* (Russel, 1935) (Fig. 3G)

Material examined: Praia de Santa Rita, Extremoz, 09.III.2009, one specimen, 4 mm (body length), leg. V. Padula (MZSP 97081). Praia de Pirambúzios, Nísia Floresta, 06.V.2008, one specimen (lost), 10 mm (body length), phot. reg. N. Filho. Praia de Baía Formosa, Baía Formosa, 04.VII.2009, two specimens, 6-9 mm (body length), leg. G. Grimaldi (MZSP 97070), 05.VII.2009, six specimens, 4-15 mm (body length), leg. F. Santos (GEEFAA 263a, 329). 03.I.2011, one specimen, 10 mm (body length), leg. M. Delgado (GEEFAA 332).

Description: Body oblong, up to 25 mm (body length) in length. Border of mantle reddish-orange-yellowish reticulated pattern. Anteriorly, elongated notum covering head and foot, dark-colored from midlength to posterior, where visceral mass is located. Rhinophores and gills white and purple. Retractable, lamellate rhinophores curved posteriorly. Anus surrounded by flattened, retractile, gill leaves. Posterior of body acute, orange to reddish dorsally, and white ventrally.

Geographic distribution: Western Atlantic: Aruba, Bermuda, Bonaire, Costa Rica, Colombia, Cuba, Curaçao, Guadeloupe, Jamaica, Panama, St. Vicent & the Grenadines, USA, Venezuela, Virgin Islands, Brazil (Ceará, Rio Grande do Norte, Alagoas, Bahia, Rio de Janeiro and São Paulo) (Marcus, 1957; Domínguez *et al.*, 2006; García *et al.*, 2008; Padula *et al.*, 2012, Sales *et al.*, 2013; Galvão-Filho *et al.*, 2015; Padula *et al.*, 2016).

Genus *Felimare* Ev. Marcus & Er. Marcus, 1967

23. *Felimare* sp. (Fig. 3H)

Material examined: Cabeço de Barreirinhas, Nísia Floresta, 20.VI.2009, one specimen, 14 mm (body length), leg. V. Padula (MNRJ 13896), 18.VIII.2009, one specimen, 13 mm (body length), leg. M. Delgado (GEEFAA 313), 31.X.2009, one specimen, 15 mm (body length), leg. M. Delgado (GEEFAA 262a).

Description: Body elongated and narrow, 13 to 15 mm (body length) in length. Body blue with three dorsal, yellow and purple longitudinal lines beginning in the base of the rhinophores and gills. Head dark with white and yellow spots. Two dark spots, one medially and other posteriorly. Translucent, creamish gill. Foot dorsally dark blue, dorso-centrally and dorso-posteriorly with oval, yellow spots with white borders, ventrally white. Anteriorly with notum covering the head; eyes present; a pair of retractile lamellate rhinophores; oral tentacles very close to the mouth. Posteriorly, with seven unipinnate, retractile gill leaves around the anus.

Geographic distribution: Rio Grande do Norte (present study).

Remarks: Similar to *Felimare ruthae* (Ev. Marcus & Hughes, 1974) from the Caribbean Sea but with a different color pattern. *Felimare ruthae* has a black and blue body with a large, white submarginal band and large gill with blue apical region, while the specimens studied herein are beige and blue, without a white margin, and presenting beige gill without blue markings. Further research is needed to clarify if it represents a color variation of *F. ruthae* or an undescribed species.

Genus *Tyrinna* Bergh, 1898

24. *Tyrinna evelinae* (Er. Marcus, 1958) (Fig. 3I)

Material examined: Praia de Pitangui, Extremoz, 05.III.2019, one specimen, 18 mm (body length), leg. M. Delgado (GEEFAA 1305).

Description: Body elongated and oval, 18 mm in length. Body translucent white with many orange spots. Rhinophores translucent with opaque white tips and spot on top. Translucent gill and tail creamish white. Mantle marginal with line on edge and white glands. Foot extending beyond the mantle. Mantle wider than foot. Gills leaves bipinnate divided in three pairs.

Geographic distribution: Eastern Pacific and Eastern Atlantic (Valdés *et al.*, 2006); Western Atlantic: Costa Rica, Dominican Republic, Jamaica, Panama, Puerto Rico, Venezuela, Brazil (Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Valdés *et al.*, 2006; Rios, 2009; Belmonte *et al.*, 2015; Goodheart *et al.*, 2016).

Remarks: No morphological differences were found between specimens from the Eastern Pacific and Atlantic (Schrödl & Millen, 2001). Further molecular studies will confirm if *T. evelinae* is truly a widespread species or may represent a species complex.

Superfamily Doridoidea Rafinesque, 1815 Family Discodorididae Bergh, 1891 Genus *Diaulula* Bergh, 1878

25. *Diaulula greeleyi* (MacFarland, 1909) (Fig. 3J)

Material examined: Praia de Rio do Fogo, Rio do Fogo, 28.I.2010, one specimen, 7 mm (body length), leg. M. Delgado (GEEFAA 302). Praia de Santa Rita, Extremoz, 11.X.2008, two specimens, 5-9 mm (body length), leg. M. Delgado (MZSP 97046), 26.III.2009, two specimens, 7-10 mm (body length), leg. S. Delgado, 28.III.2009, two specimens, 6-13 mm (body length), leg. M. Delgado (GEEFAA lot 316), 26.IV.2009, five specimens, 3-20 mm (body length), leg. F. Santos (GEEFAA 259a), 24.VI.2009, four specimens, 3-14 mm (body length), leg. M. Delgado

(GEEFAA lot 316), 09.VII.2009, three specimens, 7-11 mm (body length), leg. M. Delgado (GEEFAA lot 316), 05.I.2011, one specimen, 11 mm (body length), leg. M. Delgado (GEEFAA 290). Praia de Pirambúzios, Nísia Floresta, 11.VII.2009, three specimens, 5-10 mm (body length), leg. F. Santos (GEEFAA 317), 08.XII.2013, one specimen, 6 mm (body length), leg. M. Delgado (GEEFAA 348), 15.XII.2013, three specimens, 5-10 mm (body length), leg. S. Delgado (GEEFAA 283), 18.I.2014, two specimens, 8-10 mm (body length), leg. M. Delgado (GEEFAA 341). Praia de Baía Formosa, Baía Formosa, 04.VII.2009, 15 specimens, 4-10 mm (body length), leg. M. Delgado (GEEFAA 288 – 13 expl.; MZSP 97045 – 2 expl.), 05.VII.2009, three specimens, 3-4 mm (body length), leg. F. Santos (GEEFAA 301). Praia de Pitangui, Extremoz, 11.I.2019, four specimens, 4-14 mm (body length), leg. M. Delgado (GEEFAA 1313).

Description: Body flat and elliptical, yellow-orange coloration with small, subcircular, brown-black patches, and brown-black longitudinal, subparallel lines from the base of rhinophores to the gills. Rhinophores dark brown in the laminar portion and yellow-orange in the basis. Gills brown-black with translucent orange on the margins and center portion. Conical oral tentacles, lamellate retractile rhinophores. Medial portion of notum with abundant tubercles. Mantle margins with glands. Unipinnate and retractile gills. Muscular foot narrower than the mantle, anteriorly bifurcated and short in the posterior portion.

Geographic distribution: Eastern Pacific Ocean: Mexico, Costa Rica (Camacho-García & Valdés, 2003; Valdés *et al.*, 2006; Dayrat, 2010); Western Atlantic: Bahamas, Costa Rica, USA, Brazil (Alagoas, Ceará, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (MacFarland, 1909: as *P. greeleyi*; Marcus, 1955; Ev. Marcus & Er. Marcus, 1967a; Rios, 1994; García *et al.*, 2008; Padula *et al.*, 2012; Alvim & Pimenta, 2013; Camacho-García *et al.*, 2014; Galvão-Filho *et al.*, 2015).

Genus *Discodoris* Bergh, 1877

26. *Discodoris branneri* MacFarland, 1909 (Fig. 3K)

Material examined: Praia de Pirambúzios, Nísia Floresta, 12.III.2009, three specimens, 40-70 mm (body length), leg. V. Padula (MZSP 97063; GEEFAA 309) and a fragment in 100% alcohol, leg. V. Padula (MZSP 97053); 26.III.2009, one specimen, 90 mm (body length), leg. M. Delgado (GEEFAA 326), 28.II.2010, one specimen, 64 mm (body length), leg. M. Delgado (GEEFAA 325). Praia de Baía Formosa, Baía Formosa, 04.VII.2009, one specimen, 4 mm (body length), leg. M. Delgado (GEEFAA 266). Praia de Pitangui, Extremoz, 11.I.2019, one specimen, 48 mm (body length), leg. M. Delgado (GEEFAA 1316).

Geographic distribution: Western Atlantic: Bahamas, Barbados, Cayman Islands, Colombia, Costa Rica, Guadeloupe, Honduras, Jamaica, Panama, Puerto Rico, Martinique, Mexico, St. Lucia, St. Vincent & the Grenadines,

USA, Venezuela, Virgin Islands, Brazil (Alagoas, Bahia, Ceará, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (MacFarland, 1909; Marcus, 1955, Er. Marcus & Ev. Marcus, 1970; García *et al.*, 2008, as *D. evelinae*; Padula *et al.*, 2012; Alvim & Pimenta, 2013; Galvão-Filho *et al.*, 2015).

Description: Body flat and elliptical, with dark brown spots, and three oval-shaped, black spots organized in three “lines”, and whitish spots larger in size than the last ones on the notum. Rhinophores brown with diminute, whitish spots. Gills translucent, light brown with small brown spots. Ventrally, notum creamish with irregular shaped, dark brown spots. Foot with dark brown, irregular shaped spots. Anteriorly, the edge of the mantle covering the head. Bilabiated labium. Retractable and lamellate rhinophores. Medially, notum with numerous, conical, tubercles variable in size. Posteriorly, with high, anal cone. Posteroventrally, smooth, muscular foot narrower than notum.

Genus *Geitodoris* Bergh, 1891

27. *Geitodoris pusae* (Er. Marcus, 1955) (Fig. 3L)

Material examined: Praia de Pirambúzios, Nísia Floresta, 28.II.2009, one specimen, 14 mm (body length), leg. M. Delgado (GEEFAA 338).

Description: Body flat and elliptical, with up to 60 mm in length, orange in color with small, brownish spots on the entire notum surface but irregularly distributed, and one medial, orange spot related to the visceral mass. Gills light colored with small, dark brown spots. Retractable, lamellate rhinophores dark orange on the basis and dark brown on the lamellae. Anteriorly, one pair of eyes covered by the notum, and one pair of small labia. Medially, notum with small, rounded tubercles variable in size. Posteriorly, six retractile, six-pinnated gill leaves around the anus. Foot narrower than notum.

Geographic distribution: Western Atlantic: Argentina, Costa Rica, Curaçao, Jamaica, Martinique, Puerto Rico, USA, Brazil (Alagoas, Bahia, Ceará, Pará, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Er. Marcus, 1955 and Er. Marcus & Ev. Marcus, 1970, as *D. pusae*; Domínguez *et al.*, 2006; Padula *et al.*, 2012; Alvim & Pimenta, 2013; Sales *et al.*, 2013; Galvão-Filho *et al.*, 2015).

Genus *Sclerodoris* Eliot, 1904

28. *Sclerodoris prea* (Ev. Marcus & Er. Marcus, 1967) (Fig. 3M.1 and 3M.2)

Material examined: Praia de Baía Formosa, Baía Formosa, 05.VII.2009, one specimen, 12 mm (body length), leg. M. Delgado (MZSP 97037). Praia de Pitanguí, Extremoz,

12.I.2019, two specimens, 33-35 mm (body length), leg. M. Delgado (GEEFAA 1314).

Description: Body flat and elliptical, light brown, with three longitudinal rows of large, dark brown spots, smaller, brown spots randomly distributed on the notum. Anteriorly, eyes covered by the notum, lamellate elongated light brown rhinophores. Gills translucent white with small, opaque, white spots. Medially, notum with small, rounded tubercles variable in size, with two sulci externally. Posteriorly, six retractile, foliated gills around the anus. Foot narrower than notum. Ventrally, body opaque white with small spots.

Geographic distribution: Western Atlantic: Bahamas, Barbados, Guadeloupe, Jamaica, Panama, USA, Venezuela, Brazil (Rio Grande do Norte – present study) (Ev. Marcus & Er. Marcus, 1967b; Valdés *et al.*, 2006; Gutiérrez *et al.*, 2015).

Remarks: First record from the South Atlantic Ocean.

Genus *Taringa* Er. Marcus, 1955

29. *Taringa iemanja* Alvim & Pimenta, 2013 (Fig. 3N)

Material examined: Praia de Baía Formosa, Baía Formosa, 05.VII.2009, two specimens, 24-25 mm (body length), leg. F. Santos (MZSP 97062; GEEFAA 337).

Geographic distribution: Western Atlantic: Brazil (Rio de Janeiro, Rio Grande do Norte – present study) (Alvim & Pimenta, 2013).

Description: Body flat, elliptical, dorsally dark brown with oval-shaped, dark brown spot. Ventrally, light brown notum and foot with oval-shaped, small spots. Rhinophores and gills light brown with small, irregular-shaped, dark brown spots. Bilobated labium. Lamellated, retractile rhinophores within a basal projection. Body with small-sized, rounded tubercles medially. Seven folliculated, retractile, tripinnated gill leaves around the anus. Foot smooth, narrower than and covered by the notum.

Remarks: First record from northeastern Brazil.

30. *Taringa telopia* Er. Marcus, 1955 (Fig. 3O)

Material examined: Praia de Areia Preta, Natal, 22.VI.2009, one specimen, 18 mm (body length), leg. F. Santos (MZSP 97071).

Description: Body flat, elliptical, yellowish notum with dark brown, small spots from the medial portion of the body to the margins of the notum. Rhinophores with whitish bases and light brown lamellae. Gills light brown. Head with eyes covered by edge of the mantle, bilobated labium. Lamellate retractile rhinophores. Body with small tubercles medially. Six folliculated, retractile, tripinnated gill leaves around the anus. Foot narrower than notum.

Geographic distribution: Western Atlantic: Colombia, Brazil (Alagoas, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Bergh, 1894; Er. Marcus, 1955; Ev. Marcus & Er. Marcus, 1967a; Valdés & Gosliner, 2001; García *et al.*, 2008; Padula *et al.*, 2012; Alvim & Pimenta, 2013).

Family Dorididae Rafinesque, 1815
Genus *Doris* Linnaeus, 1758

31. *Doris kyolis*
(Ev. Marcus & Er. Marcus, 1967) (Fig. 4A)

Material examined: Praia de Santa Rita, Extremoz, 04.I.2014, one specimen, 6 mm (body length), leg. M. Delgado (GEEFAA 340). Praia de Pirambúzios (mangrove), Nísia Floresta, 13.III.2009, one specimen, 14 mm (body length), leg. V. Padula (MZSP 96905), 11.VII.2009, one specimen, 10 mm (body length), phot. reg. M. Delgado; Praia de Pitangui, Extremoz, 12.I.2019, two specimens, 7-9 mm (body length), leg. M. Delgado (GEEFAA 1311).

Description: Body flattened, dark yellow with dark, irregular-shaped spots over the entire notum, two dark spots between rhinophores. Retractable, lamellate rhinophores. Anteriorly, eyes covered by the notum, and cylindrical oral tentacles and one sulcus externally. Medially, notum with numerous, rounded tubercles variable in size. Posteriorly, retractile, bipinnated and foliaceous gill leaves around the anus. Foot smooth, narrower than notum, posteriorly elongated forming a rounded, translucent tail.

Geographic distribution: Western Atlantic: Aruba, Bahamas, Barbados, Bonaire, Colombia, Curaçao, Grenada, Guadeloupe, Puerto Rico, St. Lucia, St. Vincent & the Grenadines, USA, Venezuela, Virgin Islands, Brazil (Ceará, Fernando de Noronha, Rio de Janeiro, Rio Grande do Norte – present study) (Valdés *et al.*, 2006; García *et al.*, 2008; Galvão-Filho *et al.*, 2015).

32. *Doris* sp. (Fig. 4B)

Material examined: Praia de Baía Formosa, Baía Formosa, 04.VII.2009, one specimen, 8 mm (body length), leg. M. Delgado (GEEFAA 347).

Description: Body flat and elongated, opaque light brown, with small opaque whitish, oval-shaped spots. Gills and rhinophores light yellowish. Anteriorly, one pair of eyes covered by the notum, and one pair of small, labia. Medially, notum with small, rounded tubercles variable in size. Retractable, lamellate rhinophores. Posteriorly, retractile, foliaceous, gill leaves around the anus. Foot smooth, narrower than notum.

Remarks: Juvenile specimen which specific identification could not be determined.

Suborder Cladobranchia Willan & Morton, 1984
Superfamily Dendronotoidea Allman, 1845
Family Dotidae Gray, 1853
Genus *Doto* Oken, 1815

33. *Doto chica* Marcus & Marcus, 1960 (Fig. 4C)

Material examined: Praia de Baía Formosa, Baía Formosa, 03.I.2011, three specimens, 5-6 mm (body length), leg. M. Delgado (GEEFAA 315).

Description: Body flat and elongated, whitish with light brown spots over the entire body and also white, spots. Ceratae creamish, with light pink tubercles and blue spots. Rhinophores dark brown with minute, whitish spots. Head well developed, with small eyes, elongated oral tentacles, one pair of retractile rhinophores with basal projection. Medially, with anal and genital pores elevated. Two rows of longitudinal ceratae with globose tubercles. Posteriorly, smooth foot elongated forming a prominent tail.

Geographic distribution: Western Atlantic: Bahamas, Costa Rica, Cuba, Curaçao, Mexico, Panama, Puerto Rico, USA, Venezuela, Brazil (Ceará, Rio Grande do Norte – present study, São Paulo) (Ev. Marcus & Er. Marcus, 1960; Valdés *et al.*, 2006; García *et al.*, 2008; Galvão-Filho *et al.*, 2015).

34. *Doto divae* Marcus & Marcus, 1960 (Fig. 4D)

Material examined: Parrachos de Rio do Fogo, Rio do Fogo, 25.VI.2010, one specimen, 2 mm (body length), leg. M. Delgado (GEEFAA 285).

Description: Body cylindrical and elongated, whitish with dark green spots irregularly distributed over the body. Rhinophores whitish with dark green spots. Conspicuous, well-developed head with small eyes close to the basis of the rhinophores, elongated, retractile rhinophores with robust basal projection. Anal and genital pores present mid-laterally and below the first cerata, and between second and third ceratae, respectively. Two longitudinal rows of ceratae parallel to each other, with narrow basis and with globular tubercles. Second cerata with well-developed and vertically elongated, small tubercle. Foliaceous gills between the tubercles, irregularly distributed. Posteriorly, smooth foot elongated forming a prominent, translucent tail.

Geographic distribution: Western Atlantic: Bonaire, Mexico, Puerto Rico, St. Lucia, USA, Brazil (Bahia, Ceará, Rio Grande do Norte – present study) (Marcus & Marcus, 1960; Valdés *et al.*, 2006; Rios, 2009).

Superfamily Aeolidioidea Gray, 1827
Family Facelinidae Bergh, 1889
Genus *Phidiana* Gray, 1850

35. *Phidiana lynceus* Bergh, 1867 (Fig. 4E)

Material examined: Praia de Santa Rita, Extremoz, 09.III.2009, two specimens, 19-27 mm (body length), leg.

J. Bahia (MZSP 97035; GEEFAA 299), 26.IV.2009, three specimens, 15-21 mm (body length), leg. M. Delgado (GEEFAA 314), 24.VI.2009, four specimens, 5-14 mm (body length), phot. reg. M. Delgado, 05.I.2011, one specimen, 16 mm (body length), leg. M. Delgado (GEEFAA 287). Praia de Cotovelo, Parnamirim, 29.VII.2009, one specimen, 14 mm (body length), leg. F. Santos (GEEFAA 280), 01.II.2014, three specimens, 12-14 mm (body length), leg.

M. Delgado (GEEFAA 271). Praia de Pirambúzios, Nísia Floresta, 13.II.2010, one specimen, 18 mm (body length), leg. M. Delgado (GEEFAA 274), 07.IV.2011, one specimen, 10 mm (body length), leg. M. Delgado (GEEFAA 284), 01.XII.2013, one specimen, 18 mm (body length), leg. M. Delgado (GEEFAA 306). Praia de Tabatinga, Nísia Floresta, 15.II.2014, one specimen, 12 mm (body length), leg. M. Delgado (GEEFAA 291), 02.V.2015, one specimen,

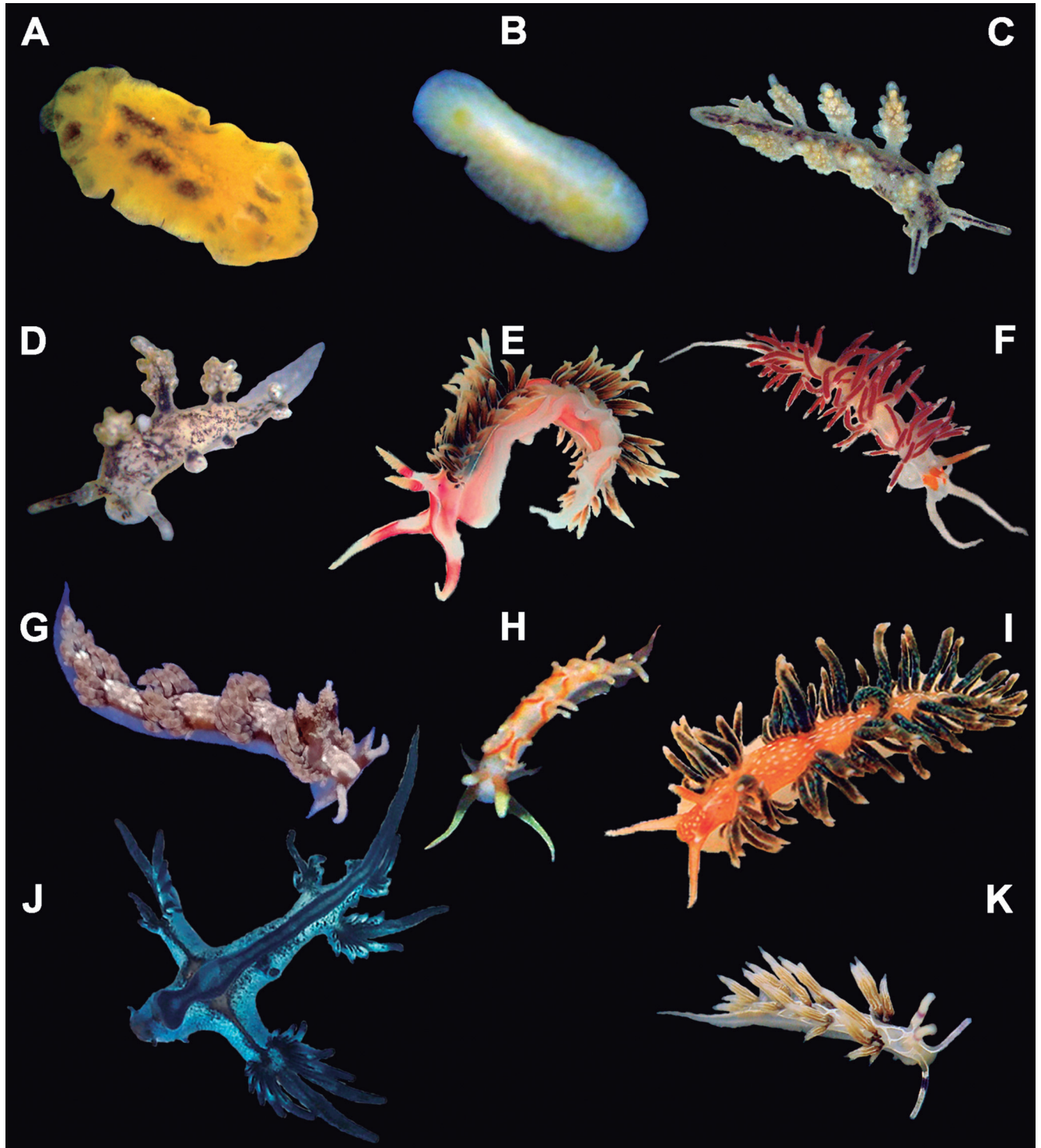


Figure 4. Heterobranch sea slugs from Rio Grande do Norte. (A) *Doris kyolis* (6 mm – GEEFAA 340); (B) *Doris* sp. (8 mm – GEEFAA 347); (C) *Doto chica* (5 mm – GEEFAA 315); (D) *Doto divae* (2 mm – GEEFAA 285); (E) *Phidiana lynceus* (27 mm – MZSP 97035); (F) *Cratena minor* (18 mm – GEEFAA 334); (G) *Berghia creutzbergi* (13 mm – GEEFAA 1306); (H) *Berghia rissodominguezi* (3 mm – GEEFAA 289); (I) *Spurilla braziliana* (13 mm – MZSP 97034); (J) *Glaucus atlanticus* (35 mm – phot. reg.); (K) *Cuthona barbadiana* (5 mm – GEEFAA 257).

12 mm (body length), phot. reg. M. Delgado. Praia de Baía Formosa, Baía Formosa, 05.VII.2009, one specimen, 3 mm (body length), leg. M. Delgado (GEEFAA 303); Praia de Pitangui, Extremoz, 11.I.2019, one specimen, 8 mm (body length), leg. M. Delgado (GEEFAA 1315).

Description: Body elongated and cylindrical, translucent whitish with three white lines, the first one dorsal, beginning in the tip of the tail and bifurcating close to the oral tentacles, ending in the anterior of each rhinophore. Other two lines lateral, beginning in the basis of the last cerata and ending in basis of the first cerata. Red-orange spot on first five rhinophore lamellae, on medial region of oral tentacles. Basis of cerata dark or light brown, cnidosacs whitish. Conspicuous, well-developed head with black eyes posterior to the basis of the rhinophores; one pair of elongated, smooth oral tentacles, wide in the basis and pointed distally, more than twice as long as the rhinophores. One pair of retractile, lamellate, conical rhinophores with robust, basal projection. Dorsal surface smooth with lateral, smooth and elongated cerata organized in rows. Posteriorly, smooth, elongated foot forming a narrow tail.

Geographic distribution: Pacific Ocean: Galapagos, Panama (Marcus & Marcus, 1967a; Gosliner, 1991); Eastern Atlantic: Canary Islands, Ghana, Savage Islands (Edmunds, 1975; Cervera *et al.*, 2004); Western Atlantic: Aruba, Bahamas, Barbados, Bonaire, Colombia, Costa Rica, Curaçao, Guadeloupe, Jamaica, Martinique, Mexico, Panama, St. Lucia, St. Maarten/St. Martin, St. Vincent & the Grenadines, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Bahia, Ceará, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo) (Rios, 1994; Valdés *et al.*, 2006; García *et al.*, 2008; Rios, 2009; Padula *et al.*, 2012; Galvão-Filho *et al.*, 2015).

Genus *Cratena* Bergh, 1864

36. *Cratena minor* Padula, Araújo, Matthews-Cascon & Schrödl, 2014 (Fig. 4F)

Material examined: Praia de Baía Formosa, Baía Formosa, 04.I.2011, two specimens, 17-18 mm (body length), leg. M. Delgado (GEEFAA 334).

Description: Elongated and cylindrical body. The color is milky translucent, with a pair of opaque and orange trapezoid spots on the side of the head, below the rhinophores and above the oral tentacles. The color of the rhinophores is filled with $\frac{2}{3}$ orange from the base and $\frac{1}{3}$ whitish from the apex to the tip, with a small white band in the whitish region formed by small spots, also present in the medial portion of the oral tentacles, making them lighter. A bright red fills the color of the cerata completely, with the exception of the apex which presents the whitish colored cnidosacs. In the posterior portion, the head is well developed with lateral black eyes below the rhinophores, smooth and well elongated oral tentacles

with a thick base and tapering at the tip, set at an oblique horizontal angle. Elongated, smooth and tapered rhinophores. In the medial portion, there are cerata arranged in six rows, the most dorsal being larger and the smaller ones arranged laterally. Foot smooth, narrow and elongated. It is bilobed, forming two thin and trapezoid projections in the anterior portion, similar to oral tentacles. The foot narrows in the posterior portion, forming a long tail.

Geographic distribution: Western Atlantic: USA (Florida) (? *Cratena cf. peregrina*) and Brazil (Ceará, Pernambuco, Rio Grande do Norte – present study) (Valdés *et al.*, 2006; Padula *et al.*, 2014).

Family Aeolidiidae Gray, 1827 Genus *Berghia* Trinchese, 1877

37. *Berghia creutzbergi* Er. Marcus & Ev. Marcus, 1970 (Fig. 4G)

Material examined: Praia de Pitangui, Extremoz, 06.I.2019, one specimen, 13 mm, leg. M. Delgado (GEEFAA 1306).

Description: Body elongated (13 mm long), gradually slender to the tail, brown with light spots on the dorsal portion and dark brown on the sides. Elongated oral tentacles, brown in the proximal portion with an opaque white tip. Rhinophores papillate with a dark brown base, gradually lightening up to the apex. Cerata cylindrical, short and arranged in 6 rows with 4-5 cerata present from the pericardium to the tail, brown color with whitish patches along them from the base to the apex. Foot translucent with lateral projections on the anterior portion and thinner on the mid-distal portion, with a small whitish translucent tail.

Geographic distribution: Western Atlantic: Aruba, Bahamas, Barbados, Bonaire, Cayman Islands, Costa Rica, Cuba, Curaçao, Guadeloupe, Panama, USA, Venezuela, Brazil (Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study) (Padula & Santos, 2006; Valdés *et al.*, 2006; Carmona *et al.*, 2014c).

38. *Berghia rissodominguezi* Munian & Ortea, 1999 (Fig. 4H)

Material examined: Praia de Baía Formosa, Baía Formosa, 05.VII.2009, one specimen, 3 mm (body length), leg. M. Delgado (GEEFAA 289).

Description: Elongated and cylindrical body. It has a whitish translucent background, with the whitish back cut by two lateral orange lines from the oral tentacles to the base of the last cerata, very translucent at the beginning of the oral tentacles. From the median to the ends the color changes to a light yellow, almost beige, the rhinophores have an orange base, yellowish in the me-

dial region and translucent in the apical region. Cerata have a translucent color with soft spots in a light orange tone, with yellowish cnidosacs. In the anterior portion there is a prominent head with lateral eyes and, below the base of the rhinophores, smooth oral tentacles and a gradually thin thickness at the tip. Elongate and lamellated rhinophores with tips thinner than the base, with an oblique angle. In the medial region, there are very long and thin cerata, arranged in pairs of six rows on the lateral side. The muscular foot is broad and flat, becoming well tapered in the posterior portion, forming a slender tail.

Geographic distribution: Western Atlantic: Argentina, Aruba, Bonaire, Curaçao, Guadeloupe, Jamaica, Mexico, Panama, St. Lucia, USA, Venezuela, Brazil (Alagoas, Rio Grande do Norte – present study, São Paulo, Santa Catarina) (Marcus, 1957: as *Berghia coerulescens*; Padula et al., 2011; Padula et al., 2012).

Genus *Spurilla* Bergh, 1864

39. *Spurilla braziliana* MacFarland, 1909 (Fig. 4I)

Material examined: Praia de Santa Rita, Extremoz, 26.IV.2009, two specimens, 15-22 mm (body length), leg. M. Delgado (MZSP 97051), 05.I.2011, three specimens, 14-30 mm (body length), leg. M. Delgado (GEEFAA 293), 01.II.2014, one specimen, 18 mm (body length), leg. M. Delgado (GEEFAA 258a). Praia de Areia Preta, Natal, 04.VII.2009, two specimens, 8-13 mm (body length), leg. M. Delgado (MZSP 97034; GEEFAA 267). Praia de Rio do Fogo, Rio do Fogo, 28.I.2010, one specimen, 10 mm (body length), leg. M. Delgado (GEEFAA 268), Praia de Pitangui, Extremoz, 06.I.2019, one specimen, 16 mm (body length), leg. M. Delgado (GEEFAA 1312); 13.I.2019, one specimen, 13 mm (body length), leg. M. Delgado (GEEFAA 1310).

Description: Elongated and cylindrical body, up to 85 mm (body length) in length. Color varies between morphotypes. Morphotype one is predominantly translucent orange with white oval patches that run from the head to the tail, oral tentacles and orange rhinophores with whitish tips. Cerata are light brown in color, dotted with whitish oval spots, and the cnidosacs have a milky white color. Morphotype two has a predominantly translucent yellow color with a dorsal line, filled with circular bundles of oval white spots. The most evident bundle is on the pericardium, another with a trapezoid shape posterior to the rhinophores and the last one that fills the entire head of the animal. The rhinophores have a translucent base with the medial and apical region in orange tone with a white spot on the anterior side of the lamellae, translucent oral tentacles with slightly orange ends, light brown cerata, dotted with numerous oval spots in milky white tone. The cnidosac is white in color and has a white foot with a translucent tail. In the anterior portion, there is lateral eyes and below the rhinophores, elongat-

ed and smooth tentacles, set at an oblique horizontal angle, elongated, retractable and horizontal lamellated rhinophores, lamellae in a slightly conical shape. In the medial portion, the back is covered by smooth curved cerata, forming a hook, arranged in seven lateral pairs that cover the bare back, presence of a very prominent pericardium with a rounded shape, located between the first and second pair of cerata. The muscular foot is broad in the anterior portion, which is bilobed into two tentacles in the form of a horizontal trapezium. The foot becomes thinner as in the posterior end, forming a very sharp and cylindrical tail.

Geographic distribution: Eastern Pacific: Costa Rica, Hawaii, Mexico, Panama, Peru (Bertsch, 1979; Gosliner, 1979; Uribe & Pacheco, 2012); Western Pacific: Australia, China, Japan (Lin, 1992; Hamatani, 2000; Carmona et al., 2013); Western Atlantic: Argentina, Aruba, Barbados, Bahamas, Belize, Bermuda, Bonaire, Colombia, Cuba, Curaçao, Guadeloupe, Honduras, Jamaica, Mexico, Puerto Rico, St. Vincent & the Grenadines, USA, Venezuela, Virgin Islands, Brazil (Alagoas, Bahia, Ceará, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Norte – present study, São Paulo, Santa Catarina) (MacFarland, 1909; Vannucci, 1952: as *Spurilla gabriellae*; Schrödl, 2003; Pimpão & Magalhães, 2004: as *S. neapolitana*; Domínguez et al., 2008: as *S. neapolitana*; García et al., 2008; Padula et al., 2012; Carmona et al., 2014a, b; Ferreira-Jr. et al., 2015; Galvão-Filho et al., 2015).

Family Glaucidae Gray, 1827 Genus *Glaucus* Forster, 1777

40. *Glaucus atlanticus* Forster, 1777 (Fig. 4J)

Material examined: Praia de Santa Rita, Extremoz, 15.VIII.2016, one specimen, 35 mm (body length), phot. reg. P. Rocha. Praia de Ponta Negra, Natal, 02.XI.2020, two specimens, 30-32 mm (body length), phot. reg. Í. Sérgio.

Description: Elongate and flat body, up to 35 mm (body length) in length. Color silver, rhinophores, cerata, oral tentacles, back dorsum and tail predominantly dark blue and white on ventral side. Head small with a ventral, small oral tentacles and very short rhinophores on the dorsal side. There are three pairs of clusters of cerata arranged on the lateral side of the body. Clusters of cerata mobile, allowing for retraction and distension movements similar to swimming.

Geographic distribution: Widespread in the tropical and subtropical oceans (Churchill et al., 2014). Mediterranean Sea: Indian Ocean: Andaman & Nicobar Islands, Australia; Cook Island, India, Lord Howe, Madagascar, Norfolk Islands, Seychelles, South Africa, Sri Lanka, Vietnam, Yemen (Srinivasulu et al., 2012); Eastern Pacific: Costa Rica, El Salvador, Galapagos, Hawaii, Mexico, USA (Srinivasulu et al., 2012); Western Pacific: Japan, New Zealand (Srinivasulu et al., 2012); Eastern Atlantic: Azores,

Canaries, Madeira, South Africa (Srinivasulu *et al.*, 2012); Western Atlantic: Aruba, Argentina, Barbados, Bermuda, Jamaica, Mexico, Uruguay, USA, and Brazil (Alagoas, Bahia, Rio Grande do Norte – present study, São Paulo and Rio Grande do Sul) (Valdés *et al.*, 2006; Segovia & López, 2015; Pinotti *et al.*, 2019).

Remarks: First record from Rio Grande do Norte. The specimens from both localities sampled were found at the seaside stranded close to *Velella velella* (Linnaeus, 1758).

Superfamily Fionoidea Gray, 1857
Family Cuthonidae Odhner, 1934
Genus *Cuthona* Alder & Hancock, 1855

41. *Cuthona barbadiana*
Edmunds & Just, 1983 (Fig. 4K)

Material examined: Praia de Pirambúzios, Nísia Floresta, 01.XII.2013, one specimen, 5 mm (body length), leg. M. Delgado (GEEFAA 257).

Description: Translucent, predominantly grayish background coloration, presenting a network of opaque white lines starting from the tail in a single dorsal line, entering the notum in the form of a complex network, bordering the pericardium, passing between the rhinophores and rising halfway up. In the head, the line bifurcates into two lateral and thin lines, reaching the middle of the oral tentacles, where it is interrupted by a medial ring, thick and opaque in purple tone, in the most terminal portion the white band continues to fill the tentacle until the far end. The rhinophores have a whitish base interrupted by a medial ring, thick and opaque in the shade of purple and then continue the white tone to the end. Cerata are dark brown in the insertion and base, changing to light brown in the medial portion, cut by a network of thin longitudinal lines in white color and whitish-colored cnidosacs. In the anterior portion, there is a very prominent rounded head with black eyes arranged laterally, below the rhinophores, elongated and smooth oral tentacles, set at a horizontal angle, slightly sloping, a pair of smooth and elongated rhinophores, with the base slightly thicker than the edges. In the medial portion, cerata are oblong with a very thick medial portion and a very narrow insertion. The muscular foot is narrow, in the anterior portion it is rounded, forming two small tentacles and in the posterior portion it thins, turning into a long translucent tail.

Geographic distribution: Western Atlantic: Barbados, Bahamas, Brazil (Ceará and Rio Grande do Norte – present study) (Valdés *et al.*, 2006; Galvão-Filho *et al.*, 2015).

Remarks: This is the second record of *C. barbadiana* from Brazil. The species was recently recorded by Galvão-Filho *et al.* (2015) based on material collected in Ceará, northeastern Brazil.

DISCUSSION

The present study reports five new records of heterobranch species from South Atlantic Ocean and, consequently, Brazil. Furthermore, two are new records for the northeastern Brazilian coast and 36 are for the first time recorded from Rio Grande do Norte State. Then, the number of species from Rio Grande do Norte raises from 14 to 50 species. Due to the high number of species found, almost four times higher than previously recorded, it is clear that there are still a gap of knowledge of the diversity of heterobranchs from northeastern Brazil. In the last years, different works contributed to fill part of this gap, including checklists, new records and the discovery and description of new species (*e.g.*, Padula & Santos, 2006; García *et al.*, 2008; Padula & Delgado, 2010; Lima & Delgado, 2011; Padula *et al.*, 2012; Sales *et al.*, 2013; Silva *et al.*, 2013; Silva *et al.*, 2014; Alvim & Pimenta, 2015; Galvão-Filho *et al.*, 2015). However, despite this effort, the coast of Rio Grande do Norte remained almost unexplored.

Similar to the results reported in the checklists from Alagoas and Ceará States, the order Nudibranchia stands out with 21 species of the 41 heterobranchs identified. Padula *et al.* (2012) listed 18 nudibranch species among a total of 28 heterobranchs from Alagoas State, while Galvão-Filho *et al.* (2015) listed 25 nudibranch species among 36 heterobranchs found in Ceará State. These findings support the hypothesis of Wägele & Willan (2000), that the adaptive irradiation of Nudibranchia into different habitats and diets resulted in larger diversity and species richness of the group.

On the other hand, the Acteonoidea is the group with the lowest number of records found, with a single species, *Micromelo undatus*. Similarly, Padula *et al.* (2012) recorded only four acteonoids among 28 species from Alagoas State, and Galvão-Filho *et al.* (2015), three acteonoid species among 35 heterobranchs recorded from Ceará State. In the broader study of García & Bertsch (2009) the Acteonoidea were also scarce, with only eight species among 93 heterobranchs listed for the Brazilian province. This low diversity of Acteonoidea in these checklists is a result of the overall low richness of the group when compared to other heterobranchs but also reflects their scarcity on hard, reef substrate which was the focus of sampling in the present study.

The five new records from Brazil, *Chelidonura hirsutinina*, *Sclerodoris prea*, *Thuridilla malaquita*, *Berthella nebula* and *Berthella vialactea* were all originally described or previously recorded from the Caribbean Sea (Valdés *et al.*, 2006; Ghanimi *et al.*, 2020; Martín-Hervás *et al.*, 2021). Their occurrence in Brazil indicate that these species were able to cross the extensive Amazon River plume. They may also be part of cryptic species complexes that can be further explored with increased sampling and molecular data. The hypothesis of a possible connection between the Caribbean Sea and the Brazilian coast was discussed by Collette & Rützler (1977). This connection would be possible through a corridor in a deep reef formation in the region of the mouth of the Amazon

River. Although exposed to high levels of sedimentation and salinity changing, there is an extensive reef with representatives of both biogeographic regions (Joyeux *et al.*, 2001). However, in ice ages when the sea level declined, this corridor became inaccessible allowing geographic isolation of populations (Joyeux *et al.*, 2001). The faunal similarity between the Caribbean Sea and the Brazilian coast is also recorded for other marine groups. Rocha & Costa (2005), for example, reported 17 new occurrences of tunicates from Arraial do Cabo, southeastern Brazil, among them only a single species does not occur in the Caribbean Sea.

In the present study, the higher number of species was found in the Environmental Protection Areas (APAs) of Rio do Fogo (Fig. 1, point 2), Maracajaú (Fig. 1, point 3) and Santa Rita (Fig. 1, point 5). *Chelidonura hirundinina*, *Doto divae* and *Thuridilla malaquita* were only found in these protection zones. These findings support the importance of protected zones, which maintain a high heterogeneity of habitats conserved in their natural state when compared to more homogeneous habitats that suffer environmental impacts (Feitosa *et al.*, 2002; Melo *et al.*, 2002; Mayal *et al.*, 2009; Mendes *et al.*, 2009). Although some previous studies showed a higher diversity in the Coral Reefs Environmental Protection Area (APARC) (Feitosa *et al.*, 2002; Melo *et al.*, 2002; Garcia-Jr., 2006; Martinez *et al.*, 2012), our sampling was very reduced in the APARC, not allowing a deep discussion. Despite this, we found eight species in this area and it is expected that further samplings will increase the number of species recorded due the existence of different benthic microhabitats and diverse food sources for the heterobranchs, such as macroalgae, porifera, tunicates, cnidarians, polychaetes and molluscs (Mayal *et al.*, 2009; Mendes *et al.*, 2009; Silva, 2010; Martinez *et al.*, 2012; Viana, 2013).

CONCLUSION

With the increase in the list of species due to the new records for the Rio Grande do Norte State, it is concluded that the diversity of Heterobranchia mollusks remains underestimated in the study region and shows the high potential of unknown species in the Brazilian coast, requiring new regional faunal studies, mainly from a molecular perspective.

AUTHORS' CONTRIBUTIONS: MD: Writing – original draft, Visualization; MD, VP, SNB, JB: Methodology, Investigation; MD, VP, SNB, FAMF, RGD: Resources; VP, SNB, CAOM: Writing – review and editing. All authors actively participated in the discussion of the results, they reviewed and approved the final version of the paper.

CONFLICTS OF INTEREST: Authors declare there are no conflicts of interest.

FUNDING INFORMATION: This project did not use any external financial support.

ACKNOWLEDGEMENTS: We thank the coordinator Bruno Goto and professors of the Programa de Pós-Graduação em Sistemática e Evolução (PPGSE) of Universidade Federal do Rio Grande do Norte (UFRN), the professor doctor Franklin Noel dos Santos (UFES) for constant support, the PADI diving instructor Paul Bouffis and Caju Divers Dive Center for all the support in the scuba dives. We thank Thaisa Accioly for providing material from Parrachos de Maracajaú, the collaborators Ítalo Sérgio and Pâmela Rocha for providing photos of some specimens from Santa Rita and Ponta Negra beaches. We thank the colleague Carlo Magenta Cunha for his support in processing the material at MZUSP. Vinicius Padula thanks FAPERJ (26/200.102/2019; Programa de Apoio Emergencial ao Museu Nacional) and CAPES for their financial and lab restructuring support. A special thanks to Ms. Silvia Delgado for all the effort invested during all these years looking for sea slugs with us, even without being her area of expertise she was present in most field trips and helped in the collection of specimens, including new records.

REFERENCES

- Alexander, J. & Valdés, Á. 2013. The ring doesn't mean a thing: molecular data suggest a new taxonomy for two Pacific species of Sea Hares (Mollusca: Opisthobranchia, Aplysiidae). *Pacific Science*, 67(2): 283-294. <https://doi.org/10.2984/67.2.10>.
- Alves, J.; Lima, M.; Johnsson, R. & Neves, E.G. 2022. New species of *Caliphylia* (Gastropoda: Hermaeidae) from tropical southwestern Atlantic. *Journal of Conchology*, 44(3): 287-299.
- Alvim, J. & Pimenta, A.D. 2013. Taxonomic review of the family Discodorididae (Mollusca: Gastropoda: Nudibranchia) from Brazil, with descriptions of two new species. *Zootaxa*, 3745(2): 152-198. <https://doi.org/10.11646/zootaxa.3745.2.2>.
- Alvim, J. & Pimenta, A.D. 2015. Taxonomic review of *Berthella* and *Berthellina* (Gastropoda: Pleurobrancoidea) from Brazil, with description of two new species. *Zoologia*, 32(6): 497-531. <https://doi.org/10.1590/S1984-46702015000600010>.
- Alvim, J.; Padula, V. & Pimenta, A.D. 2011. First record of the genus *Onchidoris* (Gastropoda: Nudibranchia: Onchidorididae) from the South Atlantic Ocean, with the description of a new species from Brazil. *Journal of the Marine Biological Association of the United Kingdom*, 91(2): 505-511. <https://doi.org/10.1017/S002531541000202X>.
- Andrade, L.C.; Leite, T.S.; Dutra, B.F. & Oliveira, J.E.L. 2005a. Caracterização da fauna de bivalves (filo Mollusca) do litoral do Rio Grande do Norte. In: Encontro Brasileiro de Malacologia, 19º. *Anais*. Rio de Janeiro, Universidade do Estado do Rio de Janeiro (UERJ).
- Andrade, L.C.; Leite, T.S.; Dutra, B.F. & Oliveira, J.E.L. 2005b. Caracterização da fauna de gastropodas (filo Mollusca) do litoral do Rio Grande do Norte. In: Encontro Brasileiro de Malacologia, 19º. *Anais*. Rio de Janeiro, Universidade do Estado do Rio de Janeiro (UERJ).
- Bazzicalupo, E.; Crocetta, F.; Gosliner, T.M.; Berteaux-Lecellier, V.; Camacho-García, Y.E.; Chandran, B.K.S. & Valdés, Á. 2020. Molecular and morphological systematics of *Bursatella leachii* de Blainville, 1817 and *Stylocheilus striatus* Quoy & Gaimard, 1832 reveal cryptic diversity in pantropically distributed taxa (Mollusca: Gastropoda: Heterobranchia). *Invertebrate Systematics*, 34(5): 535-568. <https://doi.org/10.1071/IS19056>.

- Belmonte, T.; Alvim, J.; Padula, V. & Muricy, G. 2015. Spongivory by nudibranchs on the coast of Rio de Janeiro State, southeastern Brazil. *Spixiana*, 38(2): 187-195.
- Bergh, L.S.R. 1894. Die Opisthobranchien. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U.S. Fish Commission steamer "Albatross", during 1891, Lieut. Commander Z. L. Tanner, U.S.N., commanding. *Bulletin of the Museum of Comparative Zoology*, 25: 125-233. <https://www.biodiversitylibrary.org/item/48546#page/5/mode/1up>.
- Bertsch, H. 1979. Tropical Faunal affinities of opisthobranchs from the Panamic province (eastern Pacific). *Nautilus*, 93(2-3): 57-61.
- Bezerra, L.E.A.; Silva, J.R.F.; Carvalho, A.F.U. & Melo, V.M.M. 2006. Histological description of the ink gland of the tropical sea hare *Aplysia dactylomela* Rang, 1828. *Acta Zoologica*, 87(3): 203-207. <https://doi.org/10.1111/j.1463-6395.2006.00234>.
- Bieler, R. 1992. Gastropod Phylogeny and Systematics. *Annual Review of Ecology and Systematics*, 23: 311-338. <https://doi.org/10.1146/annurev.es.23.110192.001523>.
- Camacho-García, Y. & Valdés, A. 2003. Caryophyllidia-bearing dorid nudibranchs (Mollusca, Nudibranchia, Doridacea) from Costa Rica. *Proceedings of the California Academy of Sciences*, 54: 65-79.
- Camacho-García, Y.E.; Pola, M.; Carmona, L.; Padula, V.; Villani, G. & Cervera, J.L. 2014. Diversity and distribution of the heterobranch sea slug fauna on the Caribbean of Costa Rica. *Cahiers de Biologie Marine*, 55(1): 109-127. <https://doi.org/10.21411/CBM.A.8B3AE5D2>.
- Carmona, L.; Pola, M.; Gosliner, T.M. & Cervera, J.L. 2013. A Tale That Morphology Fails to Tell: A Molecular Phylogeny of Aeolidiidae (Aeolidida, Nudibranchia, Gastropoda). *PLoS ONE*, 8(5). <https://doi.org/10.1371/journal.pone.0063000>.
- Carmona, L.; Bhawe, V.; Salunkhe, R.; Pola, M.; Gosliner, T.M. & Cervera, J.L. 2014a. Systematic review of *Anteaeolidiella* (Mollusca, Nudibranchia, Aeolidiidae) based on morphological and molecular data, with a description of three new species. *Zoological Journal of the Linnean Society*, 171: 108-132. <https://doi.org/10.1111/zoi.12129>.
- Carmona, L.; Lei, B.R.; Pola, M.; Gosliner, T.M.; Valdés, A. & Cervera, J.L. 2014b. Untangling the *Spurilla neapolitana* (Delle Chiaje, 1841) species complex: a review of the genus *Spurilla* Bergh, 1864 (Mollusca: Nudibranchia: Aeolidiidae). *Zoological Journal of the Linnean Society*, 170: 132-154. <https://doi.org/10.1111/zoi.12098>.
- Carmona, L.; Pola, M.; Gosliner, T.M. & Cervera, J.L. 2014c. The Atlantic-Mediterranean genus *Berghia* Trinchese, 1877 (Nudibranchia: Aeolidiidae): taxonomic review and phylogenetic analysis. *Journal of Molluscan Studies*, 80(SI 5): 482-498. <https://doi.org/10.1093/mollus/eyu031>.
- Cervera, J.L.; Calado, G.; Gavaia, C.; Malaquias, M.A.E.; Templado, J.; Ballesteros, M.; García-Gómez, J.C. & Megina, C. 2004. An annotated and updated checklist of the opisthobranchs (Mollusca: Gastropoda) from Spain and Portugal (including islands and archipelagos). *Boletín Instituto Español de Oceanografía*, 20(1-4): 1-132.
- Churchill, C.K.C.; Valdés, Á. & Foighil, D.Ó. 2014. Molecular and morphological systematics of neustonic nudibranchs (Mollusca: Gastropoda: Glaucidae: Glaucus), with descriptions of three new cryptic species. *Invertebrate Systematics*, 28: 174-195. <https://doi.org/10.1071/IS13038>.
- Collette, B.B. & Rützel, K. 1977. Reef fishes over sponge bottoms off the mouth of the Amazon River. International Coral Reef Symposium, 3^o. *Proceedings*. Miami, Florida, University of Miami. p. 305-310.
- Cunha, C.M. 2011. A new species of *Acteon* (Opisthobranchia: Acteonidae) from Northeast Brazil. *Zoologia*, 28(2): 229-232. <https://doi.org/10.1590/S1984-46702011000200012>.
- Cunha, C.M.; Saad, L.D. & Lima, P.O. 2014. Rediscovery of Brazilian corambids (Gastropoda: Onchidorididae). *Marine Biodiversity Records*, 7(e14). <https://doi.org/10.1017/S1755267214000062>.
- Dayrat, B. 2010. A monographic revision of basal Discodorid sea slugs (Mollusca: Gastropoda: Nudibranchia: Doridina). *Proceedings of the California Academy of Sciences*, 61(1): 1-403.
- Domínguez, M.; García, F.J. & Troncoso, J.S. 2006. Some aspects of the family Chromodorididae (Opisthobranchia: Nudibranchia) from Brazil, with description of a new species. *Scientia Marina*, 70(4): 621-634. <https://doi.org/10.989/scimar.2006.70n4621>.
- Domínguez, M.; Troncoso, J.S. & García, F.J. 2008. The family Aeolidiidae Gray, 1827 (Gastropoda Opisthobranchia) from Brazil, with a description of a new species belonging to the genus *Berghia* Trinchese, 1877. *Zoological Journal of the Linnean Society*, 153(2): 349-368. <https://doi.org/10.1111/j.1096-3642.2008.00390.x>.
- Edmunds, M. 1975. An eolid nudibranch feeding on Bryozoa. *Veliger*, 17(3): 269-270.
- Edmunds, M. 1981. Opisthobranchiate Mollusca from Ghana: Chromodorididae. *Zoological Journal of the Linnean Society*, 72(2): 175-201. <https://doi.org/10.1111/j.1096-3642.1981.tb01657.x>.
- Espinosa, J. & Ortea, J. 2001. Moluscos del Mar Caribe de Costa Rica: Desde Cahuita hasta Gandoca. *Avicennia*, (suplemento 4): 1-77.
- Feitosa, C.V.; Pimenta, D.A.S. & Araújo, M.E. 2002. Ictiofauna recifal dos Parrachos de Maracajaú (RN) na área dos flutuantes: inventário e estrutura da comunidade. *Arquivo de Ciências do Mar*, 35(1-2): 39-50. <https://doi.org/10.32360/acmar.v35i1-2>.
- Feliciano, K.; Malaquias, M.A.E.; Stout, C.; Brenzinger, B.; Gosliner, T.M. & Valdés, Á. 2021. Molecular and morphological analyses reveal pseudocryptic diversity in *Micromelo undatus* (Bruguière, 1792) (Gastropoda: Heterobranchia: Aplustridae). *Systematics and Biodiversity*, 19(2): 1-25. <https://doi.org/10.1080/14772000.2021.1939458>.
- Ferreira-Jr., A.L.; Carvalho, I.F.; Wambier, S.C. & Absher, T.M. 2015. New records of marine "sea slugs" (Mollusca: Gastropoda: Heterobranchia) in the outlets of the estuary systems in Paraná, southern Brazil. *Check List*, 11(1): 1-4. <https://doi.org/10.15560/11.1.1548>.
- Galvão-Filho, H.; Araújo, A.; Silva, F.; Azevedo, V.; Meirelles, C.A.O. & Matthews-Cascon, H. 2015. Sea slugs (Gastropoda: Heterobranchia) from a poorly known area in North-east Brazil. Filling gaps in Atlantic distributions. *Marine Biodiversity Records*, 8(e115). <https://doi.org/10.1017/S1755267215000494>.
- García, F.J. & Bertsch, H. 2009. Diversity and distribution of the Gastropoda Opisthobranchia from the Atlantic Ocean: A global biogeographic approach. *Scientia Marina*, 73(1): 153-160. <https://doi.org/10.3989/scimar.2009.73n1153>.
- García, F.J.; Domínguez-Álvarez, M. & Troncoso, J.S. 2008. *Opistobranquios de Brasil: descripción y distribución de Opistobranquios del litoral de Brasil y del Archipiélago Fernando de Noronha, Vigo, Feito*, 215p.
- García, F.J.; Troncoso, J.S. & Domínguez, M. 2002. New data on the benthic molluscs from the Archipelago of Fernando de Noronha (Brazil), with description of a new species of *Aegires* Lovén, 1844. *Iberus*, 20: 45-56.
- García-Jr., J. 2006. *Inventário das espécies de peixes da costa do estado do Rio Grande do Norte e aspectos zoogeográficos da icthiofauna recifal do Oceano Atlântico*. M.Sc. dissertation, Universidade Federal do Rio Grande do Norte, Natal, Brazil, 125p.
- Ghanimi, H.; Schrödl, M.; Goddard, J.H.R.; Ballesteros, M.; Gosliner, T.M.; Buske, Y. & Valdés, Á. 2020. Stargazing under the sea: molecular and morphological data reveal a constellation of species in the *Berthella stellata* (Risso, 1826) species complex (Mollusca, Heterobranchia, Pleurobranchidae). *Marine Biodiversity*, 50(1). <https://doi.org/10.1007/s12526-019-01027-w>.

- Goodheart, J.A.; Ellingson, R.A.; Vital, X.G.; Galvão-Filho, H.C.; McCarthy, J.B.; Medrano, S.M.; Bhawe, V.J.; García-Méndez, K.; Jiménez, L.M.; López, G.; Hoover, C.A.; Awbrey, J.D.; De Jesus, J.M.; Gowacki, W.; Krug, P.J. & Valdés, Á. 2016. Identification guide to the heterobranch sea slugs (Mollusca: Gastropoda) from Bocas del Toro, Panama. *Marine Biodiversity Records*, 9(56). <https://doi.org/10.1186/s41200-016-0048-z>.
- Gosliner, T.M. 1979. The systematics of the Aeolidacea (Nudibranchia: Mollusca) of the Hawaiian Islands, with description of two new species. *Pacific Science*, 33(1): 37-77.
- Gosliner, T.M. 1991. *The Opisthobranch gastropod fauna of the Galápagos Islands*. In: James, M.J. (Eds.). *Galápagos Marine Invertebrates*. Boston, Springer. (Topics in Geobiology. Vol. 8.). https://doi.org/10.1007/978-1-4899-0646-5_14.
- Gosliner, T.M. & Bertsch, H. 1988. A Review of the Genus *Berthella* (Opisthobranchia: Notaspidea) from the Pacific Coast of North America. *Veliger*, 31(1-2): 46-67.
- Gutiérrez, M.C.; Ortea, J.; Rivero, N.; Tucker, G.C.; Malaquias, M.A.E & Narciso, S. 2015. The opisthobranch gastropods (Mollusca: Heterobranchia) from Venezuela: An annotated and illustrated inventory of species. *Zootaxa*, 4034(2): 201-56. <https://doi.org/10.11646/zootaxa.4034.2.1>.
- Hamatani, I. 2000. A new recorded species of the genus *Spurilla* Bergh, 1864 from Osaka Bay, Middle Japan (Opisthobranchia, Aeolidacea). *Venus, Journal of the Malacological Society of Japan*, 59(3): 263-265. https://doi.org/10.18941/venusijm.59.3_263.
- Instituto de Desenvolvimento Sustentável e Meio Ambiente do Rio Grande do Norte (IDEMA). 2010. Instituto de Desenvolvimento Sustentável e Meio Ambiente. Available: <http://www.idema.rn.gov.br/Conteudo.asp?TRAN=ITEM&TARG=943&ACT=&PAGE=0&PARM=&LBL=Unidades+de+Conserva%7%E30>. Access: 17/01/2014.
- Joyeux, J.C.; Floeter, S.R.; Ferreira, C.E.L. & Gasparini, J.L. 2001. Biogeography of tropical reef fish: the South Atlantic puzzle. *Journal of Biogeography*, 28(7): 831-841. <https://doi.org/10.1046/j.1365-2699.2001.00602.x>.
- Krug, P.J.; Vendetti, J.E. & Valdés, Á. 2016. Molecular and morphological systematics of *Elysia* Risso, 1818 (Heterobranchia: Sacoglossa) from the Caribbean region. *Zootaxa*, 4148(1): 001-137. <https://doi.org/10.11646/zootaxa.4148.1.1>.
- Leite, T.S.; Andrade, L.C.A.; França, A.F.J.; Oliveira, J.E.L. & Haimovici, M. 2005. Revisão da fauna de cefalópodes da costa do Rio Grande do Norte, Brasil, com primeira ocorrência de sete espécies. In: *do COLACMAR*, 11º. *Anais. Viña del Mar*.
- Lima, P.O.V. & Delgado, M. 2011. First occurrence of *Crosslandia daedali* (Nudibranchia: Dendronotacea) in the South Atlantic, Northeast Brazil. *Strombus*, 18: 13-14.
- Lin, G. 1992. Three new species of Opisthobranchia from Hong Kong. In: Morton, B. (Ed.). *The marine flora and fauna of Hong Kong and Southern China*, 3º. Proceedings. Fourth International Marine Biological Workshop. Hong Kong, The Marine Flora and Fauna of Hong Kong and Southern China. Hong Kong, University Press. p. 181-186.
- Macfarland, F.M. 1909. *The Opisthobranchiate Mollusca of the Branner-Agassiz Expedition to Brazil*. California, Stanford University. 104p. (Leland Stanford Junior University Publications, University Series, 2) <https://doi.org/10.5962/bhl.title.23300>.
- Marcus, E. 1955. Opisthobranchia from Brazil. *Boletim da Faculdade de Filosofia, Ciências e Letras*, 207(20): 89-261. <https://doi.org/10.11606/issn.2526-3382.bffclzoologia.1955.120213>.
- Marcus, E. 1957. On opisthobranchia from Brazil (2). *Zoological Journal of the Linnean Society*, 43(292): 390-486. <https://doi.org/10.1111/j.1096-3642.1957.tb01559.x>.
- Marcus, E.D.B.R. 1977. An annotated checklist of the Western Atlantic warm water opisthobranch molluscs. *The Journal of Molluscan Studies*, Suppl. (4): 1-23.
- Marcus, E.D.B.R. & Marcus, E. 1960. Opisthobranchs from American Atlantic warm waters. *Bulletin of Marine Science of the Gulf and Caribbean*, 10(2): 129-203.
- Marcus, E.D.B.R. & Marcus, E. 1967a. American opisthobranch mollusks Part I, Tropical American opisthobranchs. *Studies in Tropical Oceanography*, 6(1-2): 1-256.
- Marcus, E.D.B.R. & Marcus, E. 1967b. American opisthobranch mollusks. Part II, Opisthobranchs from the Gulf of California. *Studies in Tropical Oceanography*, 6(1-2): 139-195.
- Marcus, E.D.B.R. & Marcus, E. 1970. Opisthobranchs from Curaçao and faunistically related regions. *Studies on the Fauna of Curaçao and Other Caribbean Islands*, 33: 1-129.
- Marcus, E. 1972. On the Anaspidea (Gastropoda: Opisthobranchia) of the warm waters of the western Atlantic. *Bulletin of Marine Science*, 22(4): 841-874.
- Marcus, E. & Hughes, H.P.I. 1974. Opisthobranch mollusks from Barbados. *Bulletin of Marine Science*, 24(3): 498-532.
- Martinez, A.S.; Mendes, L.F.; Leite, T.S. 2012. Spatial distribution of epibenthic molluscs on a sandstone reef in the Northeast of Brazil. *Brazilian Journal of Biology*, 72(2): 287-298. <https://doi.org/10.1590/S1519-69842012000200009>.
- Martín-Hervás, M.D.R.; Carmona, L.; Malaquias, M.A.E.; Krug, P.J.; Gosliner, T.M. & Cervera, J.L. 2021. A molecular phylogeny of *Thuridilla* Bergh, 1872 sea slugs (Gastropoda, Sacoglossa) reveals a case of flamboyant and cryptic radiation in the marine realm. *Cladistics*, 37(6): 647-676. <https://doi.org/10.1111/cla.12465>.
- Mayal, E.M.; Neumann-Leitão, S.; Feitosa, F.A.N.; Schwamborn, R.; Almeida e Silva, T. & Silva-Cunha, M.G.G. 2009. Hydrology, plankton, and corals of the Maracajaú reefs (Northeastern Brazil): an ecosystem under severe thermal stress. *Brazilian Archives of Biology and Technology*, 52(3): 665-678. <https://doi.org/10.1590/S1516-89132009000300019>.
- Meirelles, C.A.O.; Galvão-Filho, H.C.; Scramosin, K.A. & Matthews-Cascon, H. 2010. *Oxynoe antillarum* (Mollusca, Oxynoidae) no Estado do Ceará, Nordeste do Brasil. *Revista Nordestina de Zoologia*, 4(1): 42-47.
- Melo, N.F.A.C.; Neumann-Leitão, S.; Silva, T.A.; Schwamborn, R. & Gusmão, L.M.O. 2002. Zooplankton from the Maracajaú Reefs, Northeastern Brazil. *Tropical Oceanography*, 30(2): 133-145. <https://doi.org/10.5914/tropocean.v30i2.3900>.
- Mendes, L.; Martinez, A.; Viana, M.G. & Lima, M. 2009. *Diagnóstico dos estudos de campo referentes à biota marinha da região da Área de Proteção Ambiental dos Recifes de Corais, APARC-RN*. Relatório interno. IDEMA.
- Mikkelsen, P. 1998. *Cylindrobulla* and *Ascobulla* in the Western Atlantic (Gastropoda, Opisthobranchia, Sacoglossa): Systematic review, description of a new species, and phylogenetic reanalysis. *Zoologica Scripta*, 27(1): 49-71. <https://doi.org/10.1111/j.1463-6409.1998.tb00428.x>.
- Moro, L.; Ortea, J.; Bacallado, J.J.; Caballer, M. & Acevedo, I. 2003. Phylum Mollusca: Anaspidea, Cephalaspidea, Gymnosomata, Notaspidea, Nudibranchia, Sacoglossa y Thecosomata. In: Moro, L.; Martín, J.L.; Garrido, M.J. & Izquierdo, I. (Eds.). *Lista de especies marinas de Canarias* (algas, hongos, plantas y animales). Consejería de Política Territorial y Medio Ambiente del Gobierno de Canarias. p. 93-98.
- Nordsieck, F. 1972. *Die europäischen Meeresschnecken (Opisthobranchia mit Pyramidellidae; Rissoacea): Vom Eismeer bis Kapverden, Mittelmeer und Schwarzes Meer*. Fischer.
- Ornelas-Gatdula, E.; Camacho-García, Y.; Schrödl, M.; Padula, V.; Hooker, Y.; Gosliner, T.M. & Valdés, Á. 2012. Molecular systematics of the "*Navanax aenigmaticus*" species complex (Mollusca, Cephalaspidea): Coming full circle. *Zoologica Scripta*, 41(4): 374-385. <https://doi.org/10.1111/j.1463-6409.2012.00538.x>.
- Ornelas-Gatdula, E.; Dupont, A. & Valdés, Á. 2011. The tail tells the tale: Taxonomy and biogeography of some Atlantic *Chelidonura* (Gastropoda:

- Cephalaspidea: Aglajidae) Inferred from nuclear and mitochondrial gene data. *Zoological Journal of the Linnean Society*, 163(4): 1077-1095. <https://doi.org/10.1111/j.1096-3642.2011.00749.x>.
- Ortea, J. & Buske, Y. 2014. Una nueva especie de *Thuridilla* Bergh, 1872 (Mollusca: Sacoglossa) de la isla de Martinica, Antillas Menores. *Revista de la Real Academia Canaria de Ciencias*, 26: 189-194.
- Ouvides, T.M.; Guerrazzi, M.C. & Simone, L.R. 2011. Gastropods from Camamu Bay, state of Bahia, Brazil. *Check List*, 7(3): 328-336. <https://doi.org/10.15560/7.3.328>.
- Padula, V. 2008. Notes on the morphology of *Elysia subornata* and *Oxynoe antillarum* (Mollusca, Opisthobranchia, Sacoglossa) from the State of Rio de Janeiro, Brazil. *Strombus*, 15(2): 19-25.
- Padula, V. & Absalão, R.S. 2005. Primeiro registro de *Babakina festiva* (Roller, 1972) (Mollusca: Nudibranchia) no Atlântico Sul. *Biociências*, 13: 99-101.
- Padula, V. & Delgado, M. 2010. A new species of *Cerberilla* (Gastropoda: Nudibranchia: Aeolidiidae) from northeastern Brazil. *The Nautilus*, 124: 175-180.
- Padula, V. & Santos, F.N. 2006. Three new records of Nudibranchia (Mollusca, Gastropoda) – additions on the Brazilian biodiversity. *Biociências*, 14(2): 214-220.
- Padula, V.; Araujo, A.K.; Matthews-Cascon, H. & Schrod, M. 2014. Is the Mediterranean nudibranch *Cratena peregrina* (Gmelin, 1791) present on the Brazilian coast? Integrative species delimitation and description of *Cratena minor* n. sp. *Journal of Molluscan Studies*, 80(5): 575-584. <https://doi.org/10.1093/mollus/eyu052>.
- Padula, V.; Bahia, J.; Correia, M.D. & Sovierzoski, H.H. 2012. New records of opisthobranchs (Mollusca: Gastropoda) from Alagoas, Northeastern Brazil. *Marine Biodiversity Records*, 5: 1-11. <https://doi.org/10.1017/S1755267212000346>.
- Padula, V.; Bahia, J.; Stöger, I.; Camacho-García, Y.; Malaquias, M.A.E.; Cervera, J.L. & Schrödl, M. 2016. A test of color-based taxonomy in nudibranchs: molecular phylogeny and species delimitation of the *Felimida clenchi* (Mollusca: Chromodorididae) species complex. *Molecular Phylogenetics and Evolution*, 103: 215-229. <https://doi.org/10.1016/j.ympev.2016.07.019>.
- Padula, V.; Bahia, J.; Vargas, C.C. & Lindner, A. 2011. Mollusca, Nudibranchia: new records and southward range extensions in Santa Catarina, southern Brazil. *Check List*, 7(6): 806-808. <https://doi.org/10.15560/11037>.
- Padula, V.; Wirtz, P. & Schrödl, M. 2017. Heterobranch sea slugs (Mollusca: Gastropoda) from Ascension Island, South Atlantic Ocean. *Journal of the Marine Biological Association of the United Kingdom*, 97(4): 743-752. <https://doi.org/10.1017/S0025315414000575>.
- Pimpão, D.M. & Magalhães, A.R.M. 2004. Primeiro registro de *Spurilla neapolitana* (Gastropoda, Nudibranchia) no litoral catarinense, SC, Brasil. *Biociências*, 12(2): 181-183.
- Pinotti, R.M.; Bom, F.C. & Muxagata, E. 2019. On the occurrence and ecology of *Glaucus atlanticus* Forster, 1777 (Mollusca: Nudibranchia) along the Southwestern Atlantic coast. *Anais da Academia Brasileira de Ciências*, 91(1): 1-6. <https://doi.org/10.1590/0001-3765201920180154>.
- Redfern, C. 2001. *Bahamian Seashells*. A Thousand Species from Abaco, Boca Raton, Bahamianseashells.com, Inc. 280p.
- Redfern, C. 2013. *Bahamian Seashells*. 1161 Species from Abaco, Bahamas. Boca Raton, Bahamianseashells.com, Inc. 501p.
- Rios, E.C. 1994. *Seashells of Brazil*, Editora da Fundação Universidade Federal do Rio Grande, Rio Grande, Brazil, 368 pp.
- Rios, E.C. 2009. *Compendium of Brazilian Sea Shells*. Rio Grande, Evangraf. 668p.
- Rocha, R.M.D. & Costa, L.V. 2005. Ascidians (Urochordata: Ascidiacea) from Arraial do Cabo, Rio de Janeiro, Brazil. *Iheringia. Série Zoologia*, 95(1): 57-64. <https://doi.org/10.1590/S0073-47212005000100009>.
- Rosenberg, G.; Moretzsohn, F. & García, E.F. 2009. Gastropoda (Mollusca) of the Gulf of Mexico. In: Felder, D.L. & Camp, D.K. (Eds.). *Gulf of Mexico – Origin, Water, and Biota*. Biodiversity. Texas, Texas A&M University Press, College Station. p. 579-599.
- Sales, L.; Delgado, M.; Queiroz, V.; Padula, V.; Sampaio, C.L. & Johnsson, R. 2011. First record of *Flabellina dana* Millen and Hamann, 2006 (Mollusca: Nudibranchia) in the South Atlantic Ocean. *Check List*, 7(6): 880-882. <https://doi.org/10.15560/7.6.880>.
- Sales, L.; Queiroz, V.; Padula, V.; Neves, E. & Johnsson, R. 2013. New records of nudibranchs (Mollusca: Gastropoda) from Bahia State, northeastern Brazil. *Check List*, 9(3): 689-691. <https://doi.org/10.15560/9.3.689>.
- Schrödl, M. & Millen, S.V. 2001. Revision of the nudibranch gastropod genus *Tyrinna* Bergh, 1898 (Doridoidea: Chromodorididae). *Journal of Natural History*, 35(8): 1143-1171. <https://doi.org/10.1080/00222930152434472>.
- Segovia, J. & López, G. 2015. Registro de *Glaucus atlanticus* en la costa de El Salvador, Pacífico de Centroamérica. *Revista Mexicana de Biodiversidad*, 86(1): 1089-1090. <https://doi.org/10.1016/j.rmb.2015.05.015>.
- Silva, F.V.; Azevedo, V.M.D. & Matthews-Cascon, H. 2014. A new species of *Tritonia* (Opisthobranchia: Nudibranchia: Tritoniidae) from the tropical South Atlantic Ocean. *Journal of the Marine Biological Association of the United Kingdom*, 94(3): 579-585. <https://doi.org/10.1017/S0025315413001586>.
- Silva, F.V.; Meirelles, C.A.O. & Matthews-Cascon, H. 2013. A new species of *Marionia* (Opisthobranchia: Nudibranchia: Tritoniidae) from the tropical South Atlantic Ocean. *Journal of the Marine Biological Association of the United Kingdom*, 93(6): 1617-1624. <https://doi.org/10.1017/S0025315413001586>.
- Silva, I.B. 2010. *Algas marinhas bentônicas dos recifes e ambientes adjacentes de Maracajaú, APA dos Recifes de Corais, RN, Brasil*, 377 f. Tese (Doutorado em Biodiversidade Vegetal e Meio Ambiente) – Instituto de Botânica da Secretaria de Estado do Meio Ambiente, São Paulo.
- Srinivasulu, B.; Srinivasulu, C. & Kumar, G.C. 2012. First record of the blue sea slug (*Glaucus atlanticus*) from Andhra Pradesh – India. *Taprobanica: The Journal of Asian Biodiversity*, 4(1): 52-53. <https://doi.org/10.4038/tapro.v4i1.4386>.
- Uribe, R.A.; Pacheco, A.S. 2012. First record of *Spurilla neapolitana* (Mollusca: Nudibranchia: Aeolidiidae) on the central coast of Peru (Humboldt Current Upwelling Ecosystem). *Marine Biodiversity Records*, 5(14): 5. <https://doi.org/10.1017/S1755267211001138>.
- Valdés, Á. 2005. Subclass Opisthobranchia s. l. In: Rolán, E. (Ed.). *Malacological fauna from the Cape Verde Archipelago*. Hackenheim, ConchBooks. p. 201-248.
- Valdés, Á. & Gosliner, T.M. 2001. Systematics and Phylogeny of the caryophyllidia-bearing dorids (Mollusca, Nudibranchia), with descriptions of a new genus and four new species from Indo-Pacific deep waters. *Zoological Journal of Linnean Society*, 133(2): 103-198. <https://doi.org/10.1111/j.1096-3642.2001.tb00689.x>.
- Valdés, Á.; Alexander, J.; Crocetta, F.; Yokeş, M.B.; Giacobbe, S.; Poursanidis, D.; Zenetos, A.; Cervera, J.L.; Caballer, M.; Galil, B. & Schembri, P. 2013. The origin and dispersal pathway of the spotted sea hare *Aplysia dactylomela* (Mollusca: Opisthobranchia) in the Mediterranean Sea. *Aquatic Invasions*, 8(4): 427-436.
- Valdés, Á.; Hamann, J.; Behrens, D. & DuPont, A. 2006. *Caribbean Sea Slugs*. A field guide to the Opisthobranch mollusks from the tropical Northwestern Atlantic. Gig Harbor, WA, Sea Challengers. 289p.
- Vannucci, M. 1952. Eolidina (*Spurilla*) *gabriellae* sp. n. (Gastropoda Nudibranchia) from the State of Paraná and São Paulo. *Dusenya*, 3(4): 283-288.
- Viana, M.G. 2013. *Macrofauna de ambientes não consolidados adjacentes à recifes da área de proteção ambiental dos recifes de corais do Rio Grande do*

- Norte, Brasil/Marina Gomes Viana – Natal, 2013. 136f: il. Tese (Doutorado em Ecologia) – Universidade Federal do Rio Grande do Norte, Natal, Brasil.
- Wägele, H. & Willan, R.C. 2000. Phylogeny of the Nudibranchia. *Zoological Journal of the Linnean Society*, 130(1): 83-181.
- Xavier, E.A.; Correia, F.R.; Rangel, A.F.T.; Almeida, S.M.; Silva, A.K.P. & Fernandes, M.L.B. 2017. First registration on shore of *Caliphylla mediterranea* A. Costa, 1867 (Gastropoda: Caliphyllidae) in Pernambuco, Brazil. *Paripex – Indian Journal of Research*, 6(5): 611-612.
- Zamora-Silva, A. & Malaquias, M.A.E. 2017. Molecular phylogeny of the Aglajidae head-shield sea slugs (Heterobranchia: Cephalaspidea): new evolutionary lineages revealed and proposal of a new classification. *Zoological Journal of the Linnean Society*, 183(1): 1-51. <https://doi.org/10.1093/zoolinnea/zlx064>.
- Zamora-Silva, A. & Ortigosa, D. 2012. Nuevos registros de opistobranquios en el Parque Nacional Sistema Arrecifal Veracruzano, México. *Revista Mexicana de Biodiversidad*, 83(2): 359-369. <https://doi.org/10.22201/ib.20078706e.2012.2.957>.

APPENDIX 1: Sampling localities in the Rio Grande do Norte state, Northeastern Brazil.

Sampling localities from Rio Grande do Norte state					
Station	Figure 1	Latitude (S)	Longitude (W)	Dates	Depth (m)
Galinhos (GLN)	1	05°05'19"	36°16'31"	21.IX.2008	Intertidal
Rio do Fogo (RFG)	2	05°16'16"	35°22'55"	28.I.2010, 25.VI.2009 26.VI.2009	Intertidal
Maracajáú (MRJ)	3	05°22'12"	35°18'23"	23.IV.2015 17.V.2015	1-5 m
Pitangui (PTG)	4	05°62'40"	35°21'58"	06.I.2019, 11.I.2019, 12.I.2019, 20.I.2019, 05.III.2019, 18.V.2019, 27.XII.2019	Intertidal
Santa Rita (STR)	5	05°41'40"	35°11'57"	11.III.2009, 26.IV.2009, 24.VI.2009, 09.VII.2009, 22.VIII.2009, 05.I.2011, 04.I.2014, 01.II.2014 15.VIII.2016	Intertidal
Areia Preta (ARP)	6	05°47'35"	35°11'05"	21.VI.2009 23.VI.2009	Intertidal
Ponta Negra (PNG)	7	05°86'77"	35°17'90"	02.XI.2020	Intertidal
Cotovelo (CTV)	8	05°57'53"	35°08'31"	28.VII.2009, 29.VII.2009 01.II.2014	1-2 m
Pirangi 1 (BRR)	9	05°57'22"	35°02'20"	10.III.2009, 20.VI.2009, 18.VIII.2009, 31.X.2009, 03.XII.2009 10.XII.2009	12-18 m
Pirangi 2 (MTV)	10	05°57'53"	35°08'31"	10.XII.2009	12-25 m
Pirambúzios (PRB)	11	06°00'06"	35°06'24"	06.V.2008, 12.III.2009, 11.VII.2009, 13.II.2010, 12.IV.2011, 05.I.2012, 27.IV.2013, 08.XII.2013, 29.I.2014 15.V.2014	1-2 m
Tabatinga (TBT)	12	06°03'30"	35°05'44"	14.II.2014, 15.II.2014 01.IV.2014	Intertidal
Pipa (PIP)	13	06°13'37"	35°03'00"	15.V.2014 16.V.2014	Intertidal
Baia Formosa (BFM)	14	06°22'18"	34°59'30"	04.VII.2009, 03.I.2011, 13.V.2014 14.V.2014	Intertidal

APPENDIX 2: Number of specimens observed in each station.

	Voucher numbers of collected specimens														Total specimens
	GLN	RFG	MRJ	PTG	STR	ARP	PNG	CTV	BRR	MTV	PRB	TBT	PIP	BFM	
<i>Aplysia cervina</i>	1			1	5						2		15	15	8
<i>Aplysia dactylomela</i>				50	2		1				45	60			188
<i>Ascobulla ulia</i>					6										6
<i>Berghia creutzbergi</i>			1												1
<i>Berghia rissodominguezi</i>				1	1						2			1	1
<i>Berthella agassisi</i>				2	2									2	6
<i>Berthella nebula</i>											1			2	4
<i>Berthella violacea</i>															3
<i>Berthella ignis</i>								6	1						7
<i>Bursatella leachii</i>	1														1
<i>Cadlina rumia</i>											1			1	2
<i>Caliphyllia mediterranea</i>											3				3
<i>Camachoaglaja berolina</i>		1								3					4
<i>Chelidonura hiramidina</i>		2									3				2
<i>Cratena minor</i>														2	2
<i>Cuthona barbadiana</i>										1					1
<i>Dialutula greeleyi</i>		1		4	19					9				18	51
<i>Discodoris branneri</i>				1						5				1	7
<i>Doris lyolis</i>				2	1					2					5
<i>Doris</i> sp.														1	1
<i>Doto chica</i>														3	3
<i>Doto divea</i>		1													1
<i>Elysia canguzua</i>										41				2	43
<i>Elysia pawliki</i>										1				1	2
<i>Elysia subornata</i>										18					18
<i>Felimare</i> sp.								3							3
<i>Felimida clenchi</i>					1					1				9	11
<i>Geitodoris pusae</i>										1					1
<i>Glaucois atlanticus</i>															1
<i>Haminocoe antillarum</i>															1
<i>Micromelo undatus</i>		2		3	3					3					3
<i>Navanax gemmatus</i>			1	1	2					7	51				66
<i>Oxynoe antillarum</i>					18		5			3					7
<i>Phiadiana lynceus</i>				1	10		4			78				8	109
<i>Phyllipsia engeli</i>				1	3					3	2			1	21
<i>Sclerodoris prea</i>				2						6				2	12
<i>Spirilla braziliana</i>		1		1	6	2								1	3
<i>Tainanga iemanjá</i>															10
<i>Tainanga telopia</i>						1								2	2
<i>Thuridilla malaquita</i>															1
<i>Tyrinna evelinae</i>															1
Total	1	8	2	71	80	3	2	10	9	1	236	113	15	72	623